THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—18TH YEAR. SYDNEY, SATURDAY, MARCH 21, 1931. No. 12.

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A HYPERTROPHIC RESPONSE TO RADIUM IRRADIATION: A PRELIMINARY COMMUNICATION.[1]

By DAPHNE L. GOULSTON, B.Sc.,
Sydney.

A SERIES of experiments has been commenced to investigate the reaction of actively growing tissue to radiation from radium needles and tubes which are identical in construction to those employed therapeutically.

The chorio-allantoic membrane of a chick embryo of ten days' incubation was chosen as excellent material for the purpose in hand, since the three embryonic cell layers, namely, ectoderm, mesoderm and endoderm, are conveniently growing *in situ*.

This present paper is intended to give a brief description only of some interesting results obtained. A more detailed account will be forthcoming at a later date.

Technique.

A small window was cut in the shell of a ten-day chick embryo by means of a scalpel with a serrated edge, to expose the opaque shell membrane beneath. Radium tubes with active lengths of one centimetre, with 0·5 millimetre gold-platinum or 0·5 millimetre platinum filter, containing two to five milligrammes of radium element, were placed across the window, the ends of the radium container resting on the shell, so that no weight was sustained by the shell membrane.

Eggs were radiated thus in the incubator for periods of time varying from two to five hours. After radiation the shell was replaced over the window and sealed in position with wax.

[1] This work was carried out under the control of the Cancer Research Committee of the University of Sydney and with the aid of the Cancer Research and Treatment Fund.

After a further incubation of three days the eggs were opened and the contents gently poured out, leaving the chorio-allantoic membrane adhering to the shell membrane.

A mixture of formalin, alcohol and acetic acid was employed as the fixative.

A macroscopical examination of specimens radiated for three hours revealed irregular thickenings in the chorio-allantoic membrane. The specimens were then stained with hæmotoxylin and eosin and examined microscopically.

Following a microscopical study of the specimens in hand, it would appear that there were three distinct varieties in the response of the allantoic membrane which may depend upon the amount of radiation falling upon and being absorbed by the various tissues comprising the membrane.

In the specimens or portion of specimens which received a sufficient amount of radiation, a great hypertrophy of the mesenchyme tissue was observed. Compare Figure III with Figures I and II. With increased exposure to radiations, the hæmopoietic foci were seen to be in an active state of reproduction and a considerable multiplication of the cells of the ectodermal epithelium was evident. (See Figures IV and V).

Greater exposure to radiations produced a change in all three embryonic layers, the cells of the endodermal epithelium having in addition proliferated to form a papilla-like growth as illustrated in Figures VII and VIII.

Conclusion.

Evidence has been found that small doses of radiation from radium needles cause stimulation of growth in the chorio-allantoic membrane of the developing chick embryo.

Acknowledgement.

I wish to thank Dr. H. G. Chapman for the reading and criticism of this paper, and Professor C. W. Stump for the sections of specimens prepared by his department.

Legends to Illustrations.

FIGURE I.

Chorio-allantoic membrane showing hypertrophy of mesenchyme and little change in ectoderm and endoderm.

FIGURE II.

Chorio-allantoic membrane from same specimen as Figure I, showing greater hypertrophy of mesenchyme, distinct commencement of hæmopoiesis, but little change in ectoderm and endoderm.

FIGURE III.

Chorio-allantoic membrane normal in all particulars.

FIGURE IV.

Chorio-allantoic membrane from same specimen as I and II, showing greater hypertrophy of mesenchyme and still marked activity of hæmopoietic centres with little change in endoderm, but distinct ectodermal thickening.

FIGURE V.

Chorio-allantoic membrane of same specimen as Figures I, II and IV showing a similar degree of hypertrophy as at Figure II with, however, distinct evidence of vessel formation, distinct local thickening of ectoderm and little change in endoderm.

FIGURE VI.

Chorio-allantoic membrane from another egg with less hypertrophy of mesenchyme, distinct vessel formation, little change in endoderm, but great thickening of ectoderm.

FIGURE VII.

Chorio-allantoic membrane from same specimen as Figures I, II, IV, V showing hypertrophy of mesoderm, active formation of vessels, distinct thickening of ectoderm and papilla thickening of endoderm; a round cell infiltration is evident in one area.

FIGURE VIII.

Chorio-allantoic membrane from same specimen as Figures III and VI showing hypertrophy of mesenchyme, marked hæmopoiesis, distinct thickening of ectoderm and papilla thickening of endoderm.

Figures III, VI and VIII show microphotographs of specimens of the chorio-allantoic membrane of a chick embryo, which had been radiated with a five milligramme gold-platinum needle at a distance of approximately one millimetre for five hours.

Figures I, II, IV, V and VII show microphotographs of specimens of the chorio-allantoic membrane, which had received four hours' radiation from a five milligramme gold-platinum needle screened with 0·5 millimetre rubber tubing, at a distance of approximately one millimetre. S = shell membrane, E = ectodermal layer of epithelium, M = mesenchyme, N = endodermal layer of epithelium, P = papilla.

All specimens have been photographed and reproduced at the same power of magnification. × 250.

HEAD INJURIES AT BIRTH.

By KENRICK CHRISTIE, Ch.M. (N.Z.), F.R.C.S. (England), F.C.S.A.,
Wanganui, New Zealand.

THE writer can remember on a certain occasion speaking to a gentleman with a very bald head. Across the left fronto-parietal region was a deeply depressed furrow, like the sunken road at Waterloo, which marked out the site of the blade of the forceps when the now elderly possessor had been forcibly impelled (or adducted) into the inhospitable world. It was too late to remedy such a defect in one who had come with mature years to regard it almost as a business asset in the way of a trade mark.

But the subject of birth injuries to the cranial vault was reopened by the case which is reported below (Case I).

Case I: Indentation of Cranial Vault.

On June 9, 1929, Mrs. A.H.F., aged thirty-one, was confined with her fourth child in a good nursing home. All her confinements had been protracted and had been terminated by instruments. The third child, after a difficult forceps delivery, was stillborn. She could never estimate the date of her confinements by her menstrual periods, since she menstruated only once every six months. On examination there was only a moderate degree of pelvic flattening, with an unusually prominent sacral promontory. There was a normal head presentation. After a considerable time had elapsed to allow moulding of the head, delivery was accomplished with forceps with moderate difficulty. The child was a female and weighed 4·05 kilograms (nine pounds). During the passage of the head, grasped in the forceps, past the sacral promontory a distinct "click" could be heard. When the child's head was examined the marks of the forceps were visible. On the left side, in front of the forceps mark, there was a large indentation of the upper frontal region, corresponding to the part which would come in contact with the sacral promontory during delivery in the left occipito-anterior position (Figure I).

It was hoped that the pressure of the growing brain would push out the dent, if left to itself for a few weeks. Action was therefore delayed until July 1, when the child was three weeks old.

ILLUSTRATIONS TO THE ARTICLE BY DAPHNE L. GOULSTON.

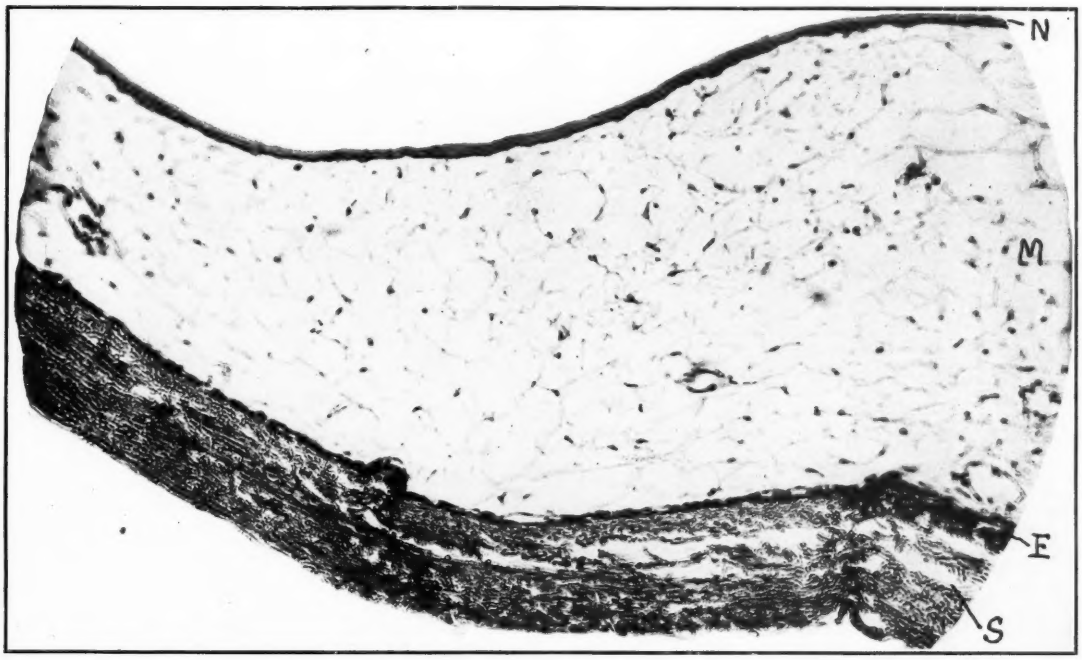

FIGURE I.

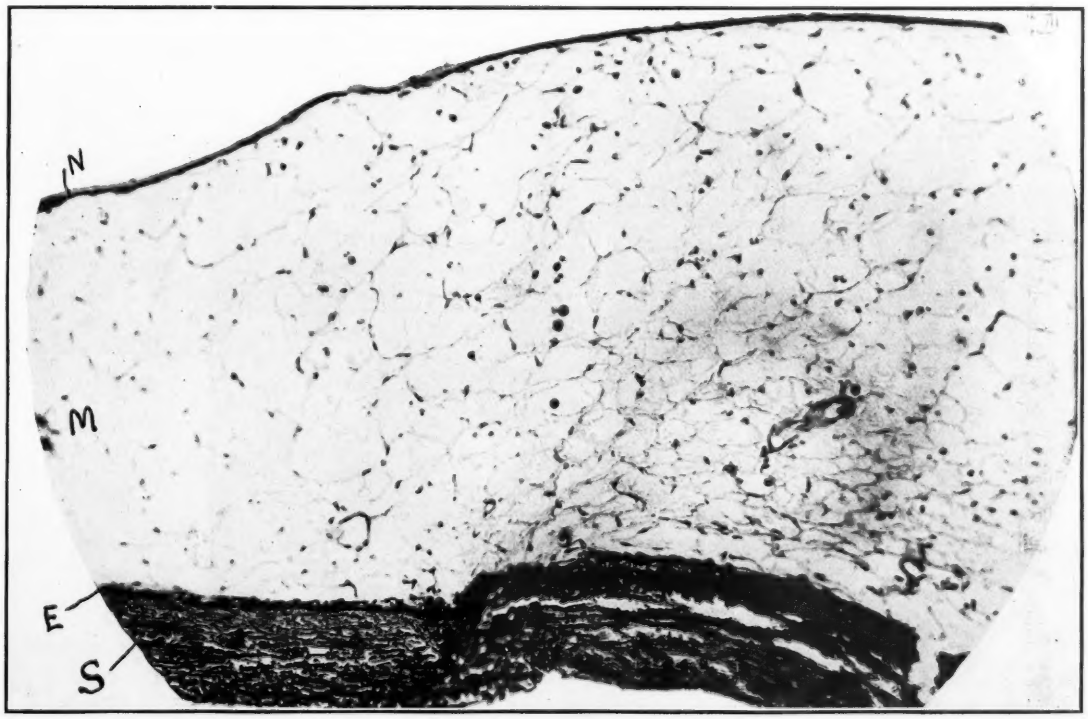

FIGURE II.

ILLUSTRATIONS TO THE ARTICLE BY DAPHNE L. GOULSTON.

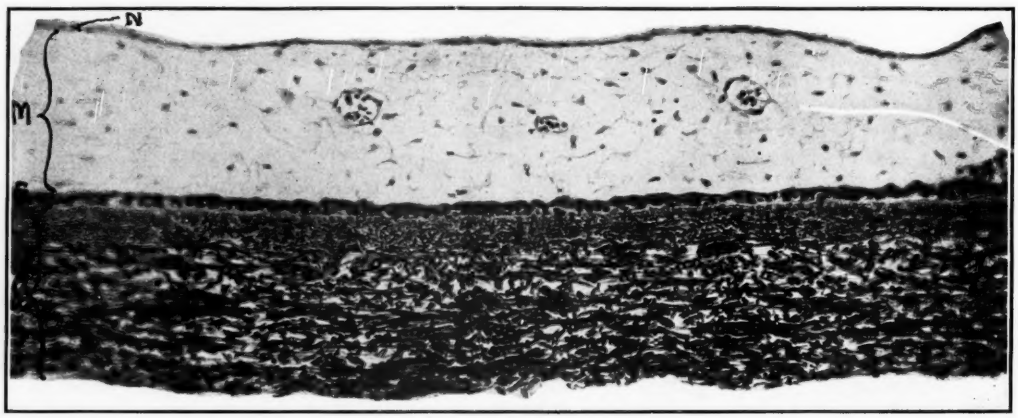

FIGURE III.

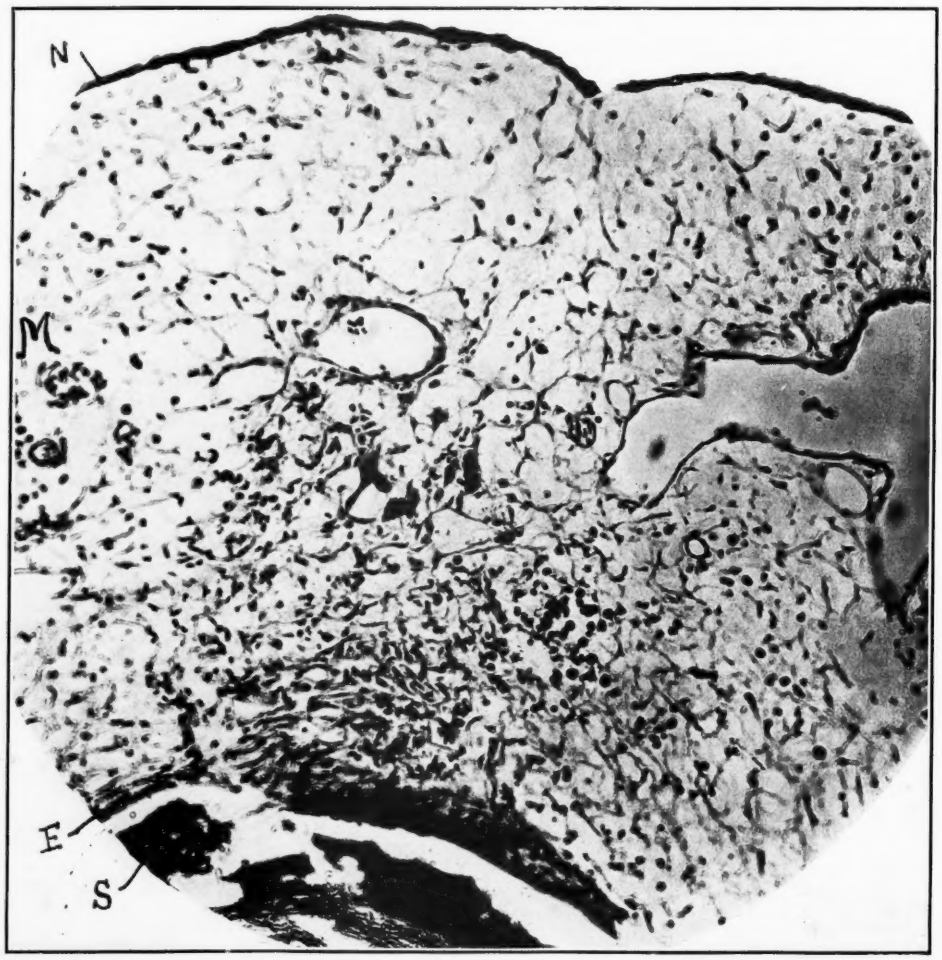

FIGURE IV.

ILLUSTRATIONS TO THE ARTICLE BY DAPHNE L. GOULSTON.

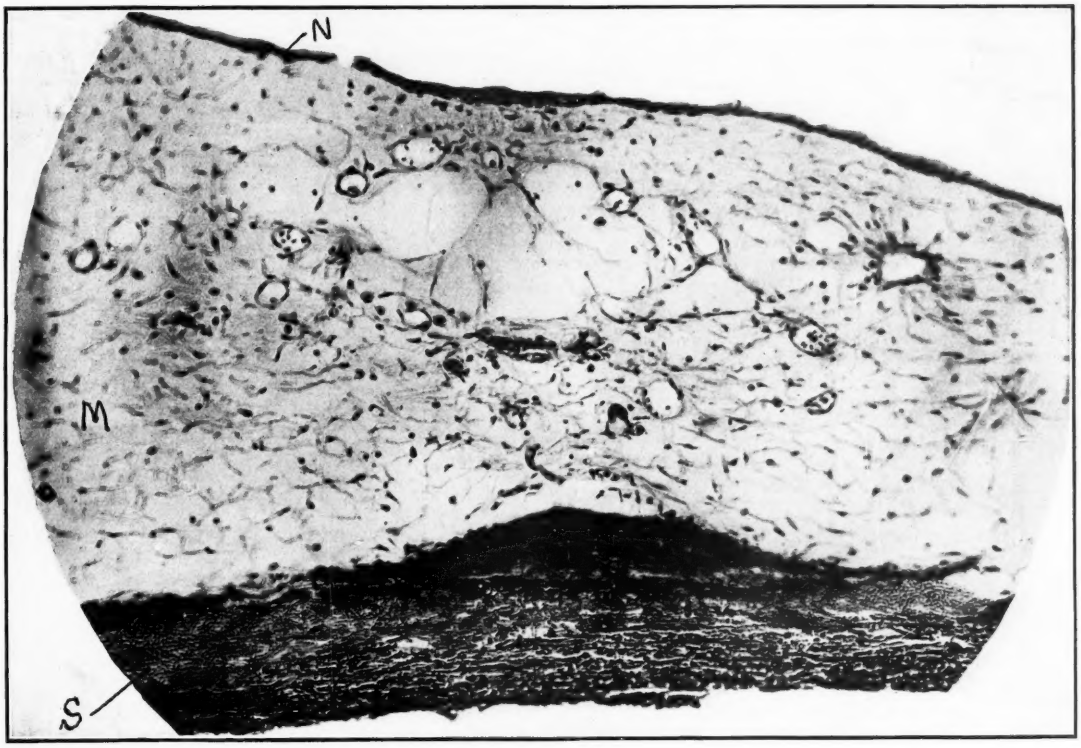

FIGURE V.

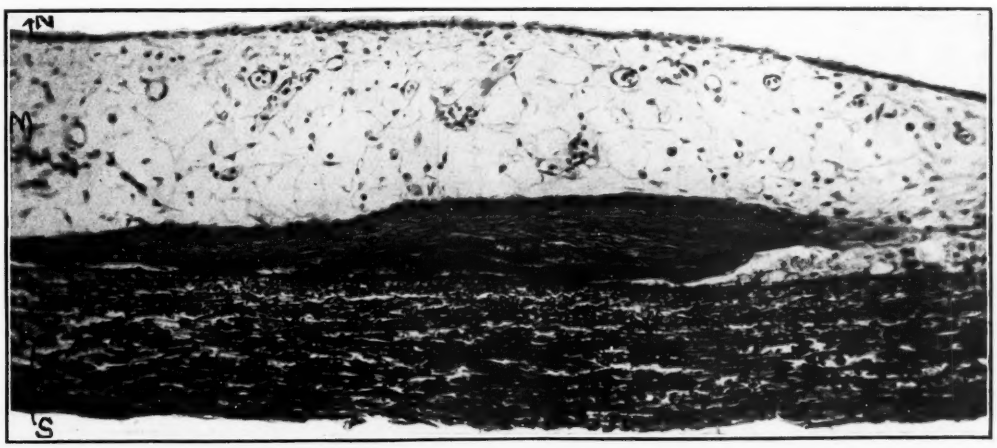

FIGURE VI.

ILLUSTRATIONS TO THE ARTICLE BY DAPHNE L. GOULSTON.

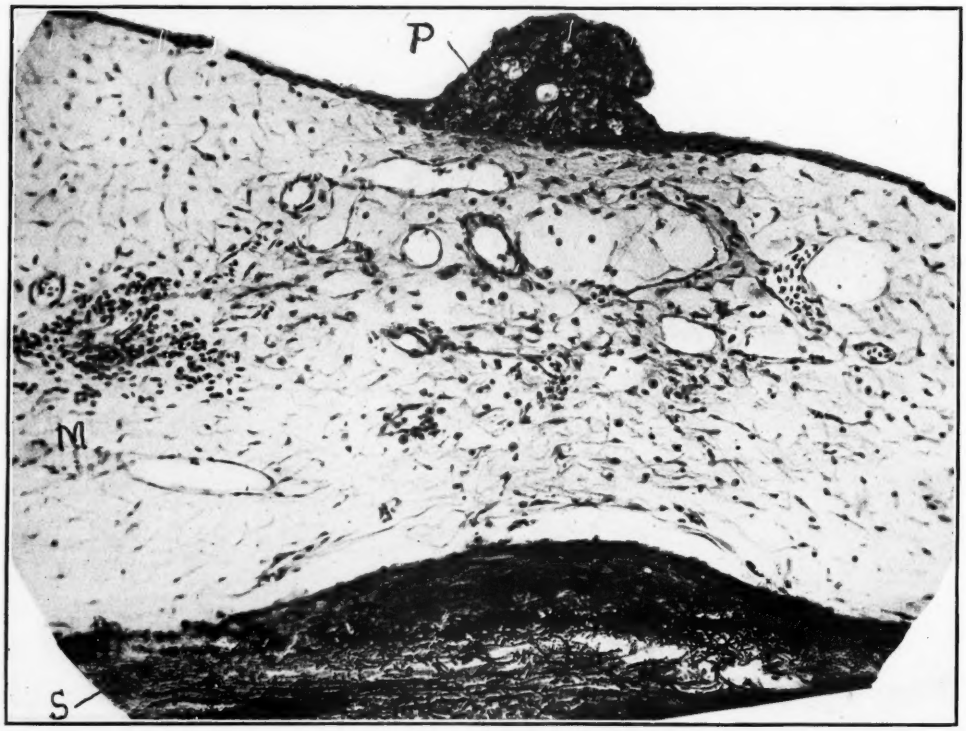

FIGURE VII.

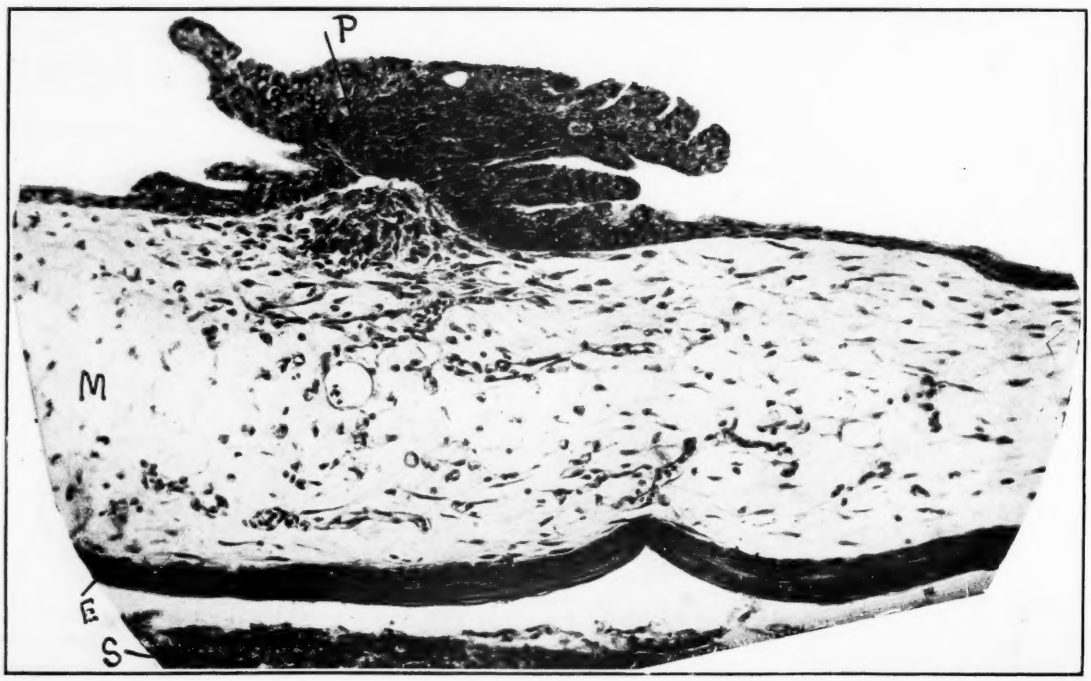

FIGURE VIII.

ILLUSTRATION TO THE ARTICLE BY DR. KENRICK CHRISTIE.

FIGURE V.

Radiogram of the skull in Case II. The separation of the bones at the anterior fontanelle is shown, the frontal bone being tilted forward. Compare with Figure IV.

ILLUSTRATIONS TO THE ARTICLE BY DR. A. E. COATES.

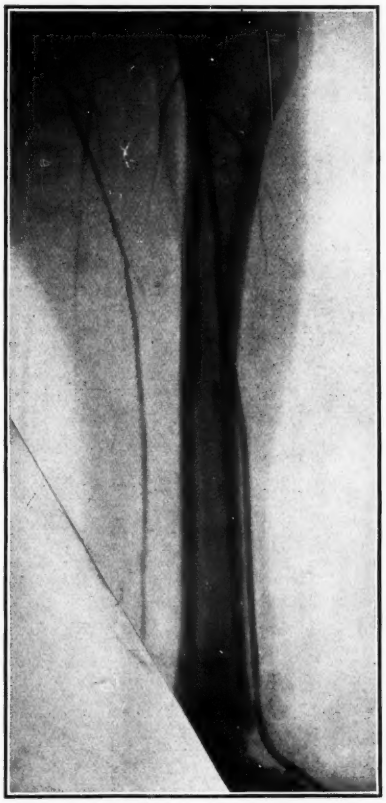

FIGURE VII.

Skiagram showing the arterial system of a living dog's leg, after injection of a mixture of "Lipiodol" and honey into the femoral artery.

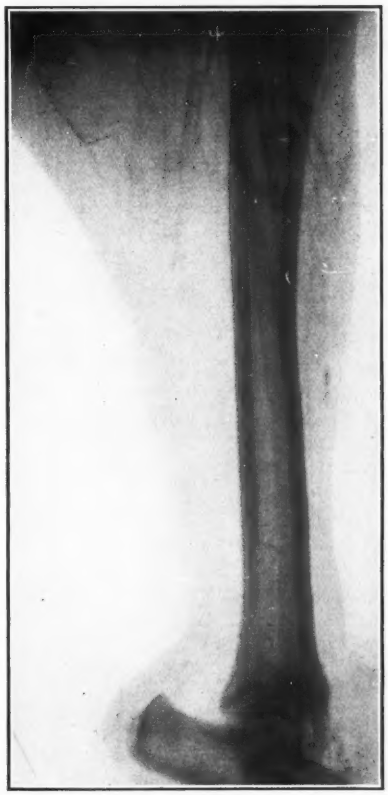

FIGURE VIII.

The same arterial system as shown in Figure VII after alcohol has been applied to the femoral artery. Constriction of the arteries of the limb is shown. The pressure of the "Lipiodol" has been kept constant.

ILLUSTRATIONS TO THE ARTICLE BY DR. RUPERT A. WILLIS.

FIGURE I.

Two transverse sections of the thyreoid and trachea, showing almost total replacement of the left lobe of the gland by white tumour tissue (A). The involvement of the right lobe is less complete.

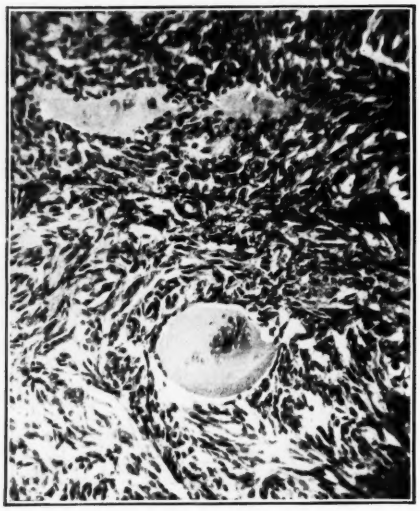

FIGURE II.

Photomicrograph showing residual atrophic thyreoid vesicles amidst diffuse spindle-celled growth. ×180.

ILLUSTRATIONS TO THE ARTICLE BY DR. BERNARD DAWSON.

FIGURE I.

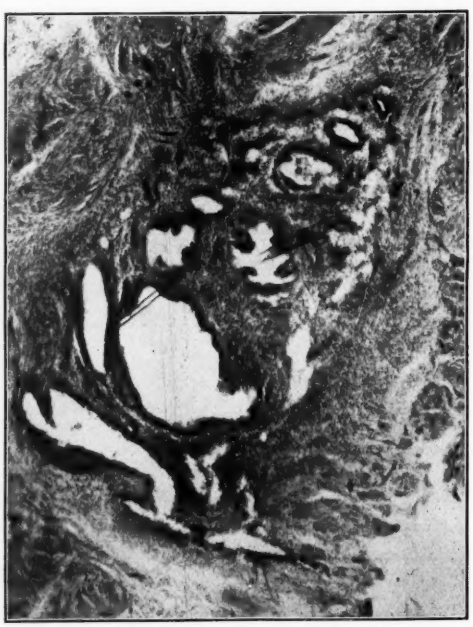

FIGURE II.

Operation was performed on July 1, 1929. A general anæsthetic was administered and a small rubber catheter used for a tourniquet to encircle the head. The scalp was incised transversely between the ears, down to the epicranial aponeurosis (the *post mortem* incision) and the anterior flap was pushed easily forward over the face, giving a good exposure of the indentation. The anterior margin of the dent was steep and it gradually shelved off to the interfrontal and fronto-parietal junctions. A 1·25 centimetre (half inch) trephine opening was made in the floor of the depression at its deepest part. The dura was preserved intact. The feet of the elevating instrument

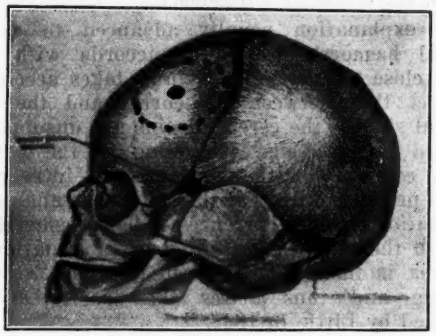

FIGURE I.

The skull at birth, lateral aspect (from Piersol). The dotted lines show the situation and extent of the indentation in the left frontal bone. The trephine hole is indicated by the dot.

shown in Figure II were inserted under the margins of the opening and splayed out. The ring of the instrument encircled the margin of the dent and the "set" of the ring caused it to lie flat upon the skull. By turning the elevating screw the dent was steadily drawn out, until over-correction was obtained. The traction was then released, whereupon the dent returned. Traction was again applied and the over-corrected position maintained for ten minutes. After this interval the correction proved permanent, although falling a little short of the normal by a slight flattening. Having satisfied ourselves that it would not relapse, we restored the scalp flap and fixed it

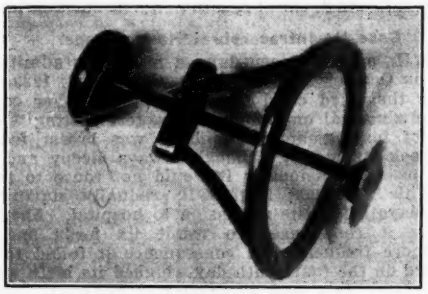

FIGURE II.

The instrument devised by the writer for raising and taking out the dent. The metal "slipring" surrounds the margin of the depressed area and provides the counterpressure, whilst the metal "feet" inserted within the trephine hole and then splayed out, are slowly raised by turning the milled screw. The instrument was made by a motor mechanic out of motor car parts and is shown half size in the illustration.

with sutures of dermol. No pressure forceps were used and there was no bleeding. The trephined circle of bone was not replaced. Healing was uneventful.

Three weeks after the operation the only sign remaining was a slight flattening of the left side as compared with the right, and the presence of the trephine hole on palpation.

Two months after the operation (age three months) there was a small, soft meningeal projection the size of half a marble through the trephine opening. Three months later (age six months) this had reduced to about half and the trephine hole was filling in round the margins.

Nine months later (age twelve months) a bar of bone had grown almost across the opening in a direction radial to the frontal ossific centre, and the meningeal bulge had disappeared.

Figure III shows the child at twelve months.

FIGURE III.

The child at twelve months of age. There is now no sign of the dent and the trephine opening is almost closed.

Comments.

The common classification of fractures of the vault into fissured, depressed and punctured, and the observations of Teevan that the indenting force, by submitting the particles of the outer table to crowding or contraction, and those of the inner table to distraction, thereby causing greater damage to the inner table, require modification in the case of the infant's skull. Certain peculiarities in the construction of the skull at birth determine the course of events when the new-born skull is submitted to deforming forces (Figure I). In the first place there is no diplöe and the damage therefore affects both tables equally. This, together with the fact that the bones have a high degree of elasticity and toughness, accounts for the greater frequency of indentations rather than actual fractures. Another fact of great importance in connexion with the birth process is the great strength of the interosseous membranes, both at the sutures and fontanelles. The skull may be crushed without these membranes being ruptured. They permit the parietal to override its fellow. The operation of long continued pressure, such as occurs in hydrocephalus will, of course, cause them to stretch gradually; but it may be said that the deforming force required to cause their disruption at birth is so great as to be fatal. Apart from the single fissured fracture running out radially from the centre of ossification, it may be remarked that on account of the above factors fissured fractures of the new-born occur only in such crushing injuries as are attended with fatal results.

It might be thought that, whereas the parietals are largely saved from injury by their freedom on all sides, the frontal, temporals and occipital, with their attachment to the fixed base, would commonly suffer fracture. Reference to Figure I will make this point clear, but it appears to have a theoretical rather than a practical value, being offset by the structural peculiarities of the infant's skull referred to above.

In response to the demands made upon it at birth and subsequently during growth, the skull has been designed by Nature to meet most of the requirements of the case. The bones are so pliable and resilient that they rarely receive a permanent distortion. The writer can recall cases of difficult labour in which it was necessary to carry out manœuvres with one hand introduced into the uterus, grasping the fœtal head. In these cases the uterine pressure during the labour pains could be felt to cause overriding of the parietal and frontal bones and on more than one occasion the pressure of the accoucheur's fingers appeared to cause an indentation of one of these bones which, when the pressure was released, could be heard to resume its normal contour with an audible "click." In the case quoted (Case I) the indentation was caused by the sacral promontory, and remained after birth.

When the mudguard of a motor car is indented the mechanic has but little trouble in getting the dent out. His method is to hammer it out in such a way that the rectifying force is applied from within or below. In the case of a dent in the skull the surgical mechanic is at a disadvantage inasmuch as he cannot work from within. His available effort is limited to traction or suction from without. The analogy of the ping-pong ball holds good. When the ball is placed in hot water the pressure of its expanding contents forces out the dent. In the same way pressure of the cranial contents during the first week often forces out the dent. The correction may be assisted by applying some form of suction over the dent. In a case reported by Dr. Williams, of Dunedin, New Zealand, in the *New Zealand Medical Journal*, 1929, a jam-jar, well vaselined around its mouth and previously filled with hot water, supplied a form of suction which was effective.[2] This method was not tried in Case I, but in the light of the operation findings, could not have succeeded, unless perhaps it had been tried immediately after birth. The only remaining method was that of mechanical elevation, as described in the case notes.

During recent years our attention has been diverted from the mechanical aspect of fractures of the skull to their concomitant damage to the cranial contents. This is as it should be, and such an attitude of mind is responsible for more rational treatment.[3] This leads us to the question why the majority of new-born children escape cerebral complications. The answer lies in the fact that the brain at birth is not fully medullated and therefore is less liable to permanent damage.

Although in most cases Nature provides for a safe passage through the parturient canal, certain cranial and intracranial birth injuries do occur and may briefly be classified as:

1. Lesions of the soft parts; for example, *caput succedaneum*, cephalhæmatoma (usually parietal).
2. Lesions of the bones; for example, indentations, fractures of the vault, fractures of base (rare).
3. Lesions of the membranes; for example, stripping up, causing hæmorrhage, either extradural or subdural.
4. Lesions of the brain; for example, hæmorrhage, cortical, subcortical or intracerebral.

The explanation usually advanced to explain cortical hæmorrhages, which accords with their origin close to the sagittal sinus, takes account of the fact that between the cortex and the parasinoidal sinuses the cerebral veins are unsupported. Granted an excessive overriding of the parietal bones, combined with the increased intracranial venous pressure during birth, we have an anatomical explanation of the occurrences of these hæmorrhages close to the middle line. In such a situation the leg area is liable to be affected by the resulting scarring and thus arises the spastic diplegia described by Little in 1862.[4]

The hæmorrhage may, more rarely, be subcortical or intracerebral and thus cause an increase of intracranial pressure both primarily and by pressure on the cerebral fluid pathways, causing secondary hydrocephalus. The hæmorrhage is venous and its onset is ingravescent, the pressure rising over a period of days. In the small infant the early signs are scanty enough. Operation is determined by the urgency of the symptoms and should in any case be carried out within ten days before organization of the clot. The operation aims merely at removal of the clot and it is surprising how well the new-born babe withstands a head operation. The value of a lumbar or cranial puncture in relieving the pressure needs no emphasis.

Case II: Intracerebral Hæmorrhage.

Baby R.H., aged fourteen days, a male, was admitted to hospital on October 28 and died on October 31, 1929. The baby was the third child of its mother and her confinement was a normal one of ten hours, terminating without the use of instruments. The baby was breast fed and usually took its meals, although always sleepy and difficult to rouse. Occasionally it would not rouse to take a feed. This lethargy increased gradually during the fourteen days before its admission to hospital. About the third day it commenced to vomit its feeds and this became more frequent. In consequence it failed to gain weight and on the fourteenth day weighed its birth weight, 3·04 kilograms (six and three-quarter pounds). It was sent into the hospital with a diagnosis of meningocele (Figure IV).

On examination there was a protuberance in the frontal region towards the left side and in front of the fontanelle. The frontal bones were separated by what appeared to be a fluid bulge, the size of a duck's egg. There was in addition a slight degree of hydrocephalus and dilated veins coursed upwards over the vault. The appearance of the head, seen from the side, is shown in the sketch (Figure IV) which was made during life. The eyes were closed and the infant was lethargic and could not be roused. It could not be fed. A throat swab taken as a routine on admission and a nasal swab yielded neither diphtheria bacilli nor the organisms of Vincent. Mixed organisms only were obtained. An X ray examination of the skull was made "for any cause of hydrocephalus." The report stated that there was "a bony deficiency of the

skull in the region of the anterior fontanelle" (Figure V). Lumbar puncture was done on September 30, fluid escaping freely under increased pressure. It had the appearance of hæmolysed blood and the centrifuged deposit consisted wholly of red blood cells with no apparent increase in leucocytes. No organisms were seen in stained films and cultures were sterile.

It was evident that there was some cause of hydrocephalus which was producing in addition a bulging of the anterior fontanelle and left frontal bone. The cause had existed from birth and might be a tumour or hæmorrhage. The location was, however, obscure, the only signs being drowsiness, vomiting and increasing hydrocephalus.

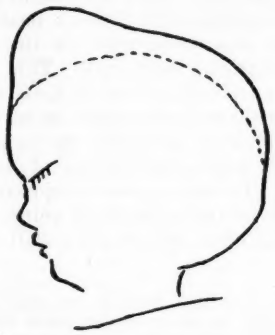

FIGURE IV.

Sketch made from life to show the outline of the skull in Case II. The forward direction of the bulging is shown. The dotted outline would correspond with a normal skull.

On October 30 a transverse incision was made as in Case I and the scalp pushed forwards, uncovering the frontal bulge. The fontanelle membrane was found very thinned out and when it was divided along the left edge the underlying brain was observed to be of normal appearance. A needle was passed into it in two places and blood-stained fluid withdrawn under increased tension. No clue was obtained as to the site of the hæmorrhage or tumour. After the tapping the child cried vigorously for the first time. The improvement was, however, short and it died on the following day after a terminal rise of temperature to 40·5° C. (105° F.).

Post mortem a clot the size of a hen's egg was found in the left occipital lobe.

Summary.

Some reflections on the subject of head injuries at birth are given, arising out of two cases in which operation was performed. Some methods of treatment are suggested and the great ease of gaining access to the infant's skull by use of the transverse *"post mortem"* incision is stressed. The after effects of leaving a trephine hole were observed for twelve months.

It is hoped that the suggestions made in relation to indentations of the skull in infants may prove of use to others in dealing with similar cases.

References.

(1) Piersol: "Human Anatomy," Volume I, Seventh Edition, "Growth of the Skull," page 230.

(2) Williams: "Clinical Note," *New Zealand Medical Journal*, 1929.

(3) Geoffrey Jefferson: "Head Injuries," "Medical Annual," 1930.

(4) Little: "On the Influence of Abnormal Parturition, etc., on the Mental and Physical Condition of the Child," *Transactions of the London Obstetrical Society*, Volume III, 1862.

PERIARTERIAL SYMPATHECTOMY: ITS USE IN ULCERS, GANGRENE AND OTHER CONDITIONS, WITH A DISCUSSION ON THE ÆTIOLOGY OF TROPHIC CHANGES.

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THE following case records have been compiled during an investigation over the past two years. An attempt has been made to evaluate the operations of periarterial stripping and alcohol injection. Twenty-two patients have been operated on and a series of animal experiments has been carried out.

Observations have also been made on patients suffering from peripheral nerve lesions and suggestions put forward offering reasonable explanation of the vaso-dilator mechanism in the extremities.

The methods of operation have followed closely those of Sampson Handley[1] and René Lériche[2] in so-called periarterial sympathectomy.[3]

In all cases in which the lower limbs were operated upon, the femoral artery was exposed under local anæsthesia ("Novocain" 0·5% with a few drops of 1 : 1,000 adrenalin solution) in Hunter's canal by an incision depending on the obesity of the patient, usually about 7·5 centimetres (three inches) long. The sartorius muscle was retracted medially, the fascia covering the femoral artery incised. The saphenous nerve was carefully separated from the femoral artery and the accompanying vein also cautiously dissected away. The femoral artery thus exposed and held on a MacCormick's dissector was ready for stripping of its adventitia or for injection with alcohol. In the first case, described later, the adventitious coat was stripped for a distance of 3·75 centimetres (one and a half inches), completely ring-barking the vessel; in all the succeeding cases absolute alcohol was injected with a fine hypodermic needle, bent to a right angle, into the sheath in several places around the circumference of the vessel until an area 2·5 to 5·0 centimetres (one to two inches) long became first yellow and then black. In each case not more than 0·3 to 0·5 mil (five to ten minims) of alcohol was used. Immediate constriction of the artery at the site of stripping or injections was noted in some cases. This was followed in some by a short period of coldness in the limb, varying from five minutes to five hours, after which the foot and leg became warmer and the patient stated that the leg felt hot. In the earlier cases the increased warmth of the limb was delayed for a longer period than in the more recent ones. There is a reason for this which will be explained later. The fascia was then sutured and the skin closed with silkworm gut and horsehair.

Some of the patients were bedridden in the wards of the Melbourne Hospital, but most of the operations were done in the Out-Patient Department of the Melbourne Hospital and the patients returned to their homes, immediately resuming their work.

Histories of Cases.

The effects of the operation are best appreciated by the following case histories:

CASE I.—Mrs. H., aged sixty-eight years, an in-patient, suffered from *diabetes mellitus*; the urine contained sugar. She was given insulin and dietetic treatment. Gangrene of the great toe occurred, involving the skin of the dorsum and plantar aspect of the terminal joint. The condition was progressive. No improvement occurred on ordinary treatment, that is, dry dressings, electric baths *et cetera*. Dr. Blois Lawton requested that something should be done to try to arrest the gangrene. Under local anæsthesia as above described, the femoral artery was stripped for 5·0 centimetres (two inches) in Hunter's canal following the procedure of Lériche. No alteration in the temperature of the limb was noted during the day of operation. The patient stated that during the night the leg felt hot; a thermometer between the toes registered a temperature 0·8° C. (1·5° F.) higher than in the opposite foot. The rise in temperature was observable for three days. Gangrene was arrested. The dead tissues separated in ten days and the toe was completely healed in three weeks.

CASE II.—Mrs. C., aged sixty-seven years, was suffering from *diabetes mellitus*. Sugar was present in the urine, although her diet was under control and she was receiving insulin. Her right leg had been removed for gangrene six years earlier. Dr. Lawton requested that periarterial sympathectomy be done, as the gangrene, which was present on the dorsum of all the toes of her remaining foot, was spreading and showed no sign of clearing up. On the same day as the patient mentioned in Case I this patient was subjected to the operation as above described, but owing to the fear of damage to the vessel and the possibility of amputation thus being rendered necessary, the femoral artery was not stripped, but a few minims of absolute alcohol were injected into the adventitia until the vessel blackened. After her return to bed the patient reported the same symptoms as those of the other patient, namely, increased warmth in the limb during the night. The temperature of the affected limb increased by 0·5° C. (1·0° F.). (Accurate methods by thermopile could not be adopted owing to the absence of this instrument.) In the course of two weeks the dead tissue separated and the toes healed.

No further evidence of gangrene has appeared in these two patients, although a period of eighteen months has elapsed since the operations. These two patients were in adjoining beds in the medical ward following the operation and as they both gave similar results it was resolved that the injection of alcohol into the femoral artery sheath, according to the technique described by Sampson Handley, was as satisfactory as Lériche's operation and it appeared less dangerous.

CASE III.—Miss S., aged eighteen years, had had poliomyelitis as a child. She suffered from *talipes equinus*. Cold, blue patches were present on the leg and foot. The foot was subject to recurrent ulceration in winter. This patient came for treatment of the talipes. Lengthening of the *tendo Achillis* was performed under general anæsthesia and in view of the cold, blue condition of the limb it was considered worth while injecting a femoral artery. The technique described in Case II was observed. Next day the patient stated that the limb felt warmer and it was apparent that the limb was no longer blue and cold. After the usual period during which her limb was in a plaster mould, she resumed her occupation. Three months later she returned to thank us for the relief she experienced from the cold foot (winter, 1929). She stated without question on the matter that she was able to put both feet together in bed at night without discomfort or waking. This she had never been able to do before. Nine months later she again returned; the limb had retained its normal colour and there were no signs of the large chilblain-like area of previous winters.

CASE IV.—Miss T., aged twenty-two years, had a history similar to the patient in Case III. There was a deformity of the foot. She was operated on for talipes and a periarterial injection was made. She experienced the same post-operative changes as the other patients and went home with a warmer leg. Unfortunately she returned to the country and no further report has been obtained.

On account of the gratifying results obtained from the adoption of this measure in cases in which the blood supply of the leg appeared defective, I resolved to try its effect on intractable ulcers of the lower half of the leg. This condition as a rule reacts to careful strapping with Unna's paste and, when varicose veins are prominent, to the injection of these with sclerosing solutions. This latter treatment in my experience clears up most of the ulcers. Unfortunately there is a residue in which there are no varicose veins or in which the veins have been sclerosed or in which thrombosis of the deep veins has occurred. In such cases it appears unwise to cause clotting in the superficial veins, and despite all attempts at cure the patients still remain with us.

CASE V.—Mrs. T., aged forty years, was three months pregnant. She had an ulcer on the lower half of the leg; it was circular, 7·5 centimetres (three inches) in diameter, and had been present for four years. The edges were hard and sclerosed, the base was indolent and fixed over the lower part of the tibia. She had been treated in various hospitals without success. The pain in the ulcer and surrounding area was constant and severe, keeping her awake at night. She had been attending the out-patient department, where she had received the usual Unna's paste treatment without improvement. Enlarged veins were present, but it was considered inadvisable to inject these owing to pregnancy. There was no reaction to the Wassermann test. This was thought to be a suitable test case for periarterial injection. Operation was performed under local anæsthesia as above. An alcohol injection was made. The patient returned home and attended to her household duties. She attended the hospital twice weekly for four months while the ulcer was dressed with small pieces of Mead's strapping and boroglyceride. Both legs were swollen, apparently on account of pregnancy. When she returned to the clinic with her new-born baby six months after injection, her ulcer had healed. The steady progress in the healing of the ulcer, whilst œdema due to pregnancy was present, suggests that something more than the simple dressing was responsible. The skin in the surrounding area is now soft and elastic and the scar moves freely on the deeper tissues. This patient stated that immediately the injection of the artery was done she was free from pain in the ulcer.

CASE VI.—Mrs. W., aged forty-four years, had an ulcer on the lower half of the leg over the subcutaneous surface of the tibia for a period of three years. She had attended hospital during the whole period; at one stage she was admitted for a skin graft which took well and later broke down. Two irregular ulcers were present, one 15·0 by 5·0 centimetres (six by two inches), the other 7·5 by 3·75 centimetres (three by one and a half inches). The edges were hard and deep, the bases were formed by the periosteum of the tibia. The surrounding skin was immovable on the deeper tissues. There were no varicose veins. There was no reaction to the Wassermann test. My assistant, Dr. Wait, injected the femoral artery in Hunter's canal. Pain was relieved. The ulcers were dressed twice a week with boroglyceride and strapping. During the succeeding weeks the ulcers gradually became softer at the edges, the skin around was warmer and more healthy and healing was almost complete six months after injection. A residue of the larger ulcer persisted, however, and no further healing occurred after six months. Skin grafting was then employed.

Case VII.—Mr. R., aged thirty years, suffered from an avulsion of the sole of his foot in a train accident eighteen months before coming under observation. The wound healed in a month, but an area devoid of skin and soft tissue was left over the medial side of the *os calcis*. The ulcer was the size of the palm of the hand; it had hard, fixed edges and base. On several occasions during the year and a half, he had been admitted to hospital for varying periods for treatment by means of rest and strapping. Two skin grafts had been done without success at the Caulfield and Melbourne Hospitals. He had become fat and flabby and the affected foot was becoming deformed into a condition of *talipes equinus*, owing to the contraction of the base of the ulcer involving the tissues on the inner side of the *os calcis*. We were ashamed of our inability to help this man and avoided him when possible. He was admitted to hospital for a third attempt at skin grafting in December, 1929. Periarterial alcohol injection of the femoral artery was performed at the same time as a tube of skin was dissected for a graft. On awakening from anæsthesia he reported to the nurse that his affected leg was hot and throbbing and that he wished to put it outside the bedclothes. During the next few days the ulcer edges became shallower and the indolent base began to show activity. At the end of six weeks, by the time the graft was due to be transferred to the foot, it had died and the ulcer had almost healed. At the end of three months the patient was at work, the ulcer had healed and the deformed foot had become almost normal. He states that now, six months after operation, the scar is not painful, no chafing occurs from his boot and on a frosty night the affected foot feels warmer than the other.

Case VIII.—Mrs. S., aged sixty-eight years, suffered from diabetic gangrene. She had glycosuria, although she was receiving insulin and her diet was regulated. There was gangrene of the outer half of the left foot; the skin and tendons of the fourth and fifth toes had sloughed off so that the bones were exposed in an area the size of the palm of the hand. Suppuration was proceeding; the *dorsalis pedis* artery was not palpable. In March, 1929, periarterial alcohol injection of the femoral artery was performed. Immediate warming of the limb was observed by the patient and operators; the artery was now palpable. A steady improvement ensued. The tendons sloughed out and the ulcer closed within three months.

Case IX.—Mrs. C., aged eighty-six years, was affected with a condition of senile gangrene of both feet. There was an area, 7·5 by 5·0 centimetres (three by two inches), of gangrenous skin and fat over the heel and the inner side of the left foot. The popliteal arteries were thick. The *dorsalis pedis* artery was not palpable. There was a small patch of gangrene on the heel of the right foot. The mental condition was poor. Alcohol injection of the femoral artery of the left leg was performed; this was followed by arrest of the gangrene and rise in the temperature of the leg. The right foot became progressively more gangrenous; as her mental condition was bad it was not considered worth while proceeding with the operation on the right side. She died within three weeks, but the left foot had improved and the slough was separating. Meanwhile the gangrenous process on the right foot had progressed until the whole foot was involved.

This case seems to suggest that the operation in such senile arteries had some effect.

Case X.—Mrs. B., aged sixty-three years, had suffered from an ulcer ring-barking her leg for twenty-eight years. She had treated it with applications of carbolic oil with resulting oöchronosis. (This case was previously reported in The Medical Journal of Australia by Dr. Keith Fairley.) A skin graft had been applied to the ulcer some years earlier with partial success, but later it had broken down. She had been in the medical ward at Melbourne Hospital for nine months while the ulcer was being treated by many methods, including the application of ultra-violet rays, diathermy *et cetera*. This case was discussed with Dr. Fairley and Mr. Tymms who requested that a periarterial injection might be tried. It appeared that the procedure would be of doubtful value. In April, 1930, periarterial injection was done. The patient was sent home and instructed to dress the leg with vaseline. Six weeks later the deep crater around the leg had changed into a number of small, shallow, superficial ulcers. Two months after operation all that remained were three small ulcers, each the size of a shilling piece. These are steadily healing, following a small skin graft.

Case XI.—Mrs. B., aged fifty years, had suffered from an ulcer on the lower half of the leg for fourteen years. She had attended as an out-patient for five years. The ulcer never completely healed. Veins had been injected, but the ulcer used to heal over and then break down. There was eczema over three-quarters of the surface of the leg. The ulcer was weeping and painful and the size of a half-crown piece. Periarterial injection of alcohol was performed. One week later the eczema of the leg had disappeared. The red patches had now become brown; there was no weeping nor pain. The ulcer was obviously healing. At the end of a further period of three weeks the ulcer had healed. The skin of the leg now had a normal, soft, fleshy appearance. Two months later an ulcer the size of a sixpenny piece reappeared over the medial malleolus.

Case XII.—Mrs. D., aged forty-four years, had suffered from several small ulcers and one large ulcer on the lower half of her leg for a period of fourteen years. The ulcers had never healed and were always painful. The veins of the leg were slightly varicose. It was decided to try the effect of periarterial injection despite the presence of the varicose veins. She had been treated at several other hospitals without success. Pain was the worst feature. Periarterial alcohol injection resulted in immediate relief of pain. The ulcer went on steadily healing for a period of one month, but at the end of this time no further healing occurred until the varicose veins were injected with a solution of quinine and urethane. Healing then continued. It is not yet complete and the ulcer is again painful.

Case XIII.—Mrs. R., aged sixty-four years, had a thrombosis of the femoral veins and a long-standing phlebitis of the leg, the lower half of which was wasted and contracted from the ulceration which used to heal and break down. A small ulcer was present. Pain was severe. Mr. Ahern asked that she be subjected to periarterial alcohol injection. This was done, but pain was only partially relieved. The ulcer healed. Some pain persists.

Case XIV.—Mr. K., aged forty-five years, had an ulcer on the anterior border of the lower half of the tibia, the result of an old burn. He had had it off and on for fourteen years. Skin had been grafted and the ulcer had healed many times. It was now 7·5 by 5·0 centimetres (three by two inches) in size and had last broken down six months before. Pain was severe. Periarterial alcohol injection was followed by immediate relief from pain; the ulcer healed within six weeks.

Case XV.—Mr. M., aged thirty years, had an ulcer on the lower half of the leg at the site of a compound fracture of the tibia and fibula sustained one and a half years before. Healing proceeded steadily after operation.

Case XVI.—Miss S. had neuritis, the result of severe *diabetes mellitus* which did not respond to insulin. Dr. Eric Cooper requested us to do periarterial alcohol injection. This resulted in some relief of the constant pain in the dorsum of the foot, but persistent shooting pains in the leg remained. She states that her leg is somewhat better. There was a temperature change in the leg for a few days only. No great improvement resulted in this case.

Case XVII.—Miss W., aged twenty-four years, suffered from cold, painful, swollen fingers simulating Raynaud's disease. Pain was severe. The fingers were blue at times. There was no gangrene. Under local anæsthesia the brachial artery was cut down upon in the middle of the right arm; it was found to be very small and accompanied by two *venæ comites*. As it was difficult to identify the separate structures, a few drops of alcohol were injected into the sheath of each. No improvement followed during the first week. At the end of the second week after operation the patient returned and showed her hand, which was warm, without pain and appeared quite normal. She,

however, insisted that the excellent result which was so obvious, was not due to operation, but to the blessing she had obtained at a meeting of Christian Scientists a few nights before. She stated that while prayer was being offered on her behalf, the leader of the meeting was holding her hand; she felt a sudden warming of the limb and it had remained warm since.[4] In this particular case I am not sure that a certain psychological factor is not intimately associated with the condition in the hands and that her faith may have played a part in the recovery of the hand. As will be seen from the above reports, the best results have been in cases of gangrene and ulceration of the leg, that is, when an improved blood supply is necessary.

CASE XVIII.—Miss G., aged twenty-six years, suffered from painful, cold, swollen patches, the size of the palm of the hand, on either side of the lower half of both legs. She had had these chilblain-like areas for years. They were much worse in winter. There was no evidence of any nerve lesion. After she had been on the standard medical treatment for several months without improvement it was decided to subject the limbs to periarterial alcohol injection under local anæsthesia. Immediate disappearance of the bluish-red areas occurred at operation. The left femoral artery was found to be very contracted when exposed at operation (the left leg was the worse of the two). Dilatation of the vessel was observed two minutes after injecting into the arterial sheath. Severe pain was felt at the site of injection when the needle was inserted into the adventitia. Next day, when examination was being made of the areas where the swellings were previously present, she remarked that there was no tenderness and that the limb felt more comfortable than it had ever felt before. There was no anæsthesia in the limb.

This case, as Case XV, illustrated the painful effect of trauma to the artery, suggesting a sensory connexion.

The right femoral artery was injected also, but during the operation the patient complained of severe pain when the artery was being handled. More alcohol than usual was injected and some passed into the canal of Hunter. The right leg improved temporarily, but ten days later she complained of pain above and below the knee on the inner side and also along the inner side of the leg as far as the medial malleolus. Hyperæsthesia was present over this area and one realized that the saphenous nerve had been damaged. The weather was cold at this time and the improvement which was noted in the condition of the left leg was absent in the right. One month later the area of hyperæsthesia on the inner side of the right leg had diminished to a small patch about the inner side of the knee. The bluish-red patches on the leg had almost completely disappeared and the patient stated that the leg felt comfortable. Three weeks later the hyperæsthesia had almost completely gone and the leg was almost well. Complete relief was obtained by neurolysis of the saphenous nerve.

In this case it would appear that the irritation of the cutaneous nerve (saphenous) was responsible for maintaining a changed condition in the vessels of the limb, preventing the improvement which occurred in the opposite limb in which the nerves were unaffected. This is in accord with the experience of other workers who find that cutting the peripheral nerve supply to an irritable ulcer brings about improved blood supply and rapid healing (Corlette).[5] The painful, swollen condition was possibly maintained or even aggravated by the irritative lesion of the saphenous nerve. (Axone reflex is discussed later in this paper.)

CASE XIX.—Mr. W., aged sixty years, had an ulcer on the leg, 5·0 by 2·5 centimetres (two inches by one inch) in size. It healed in four weeks following periarterial injection with alcohol.

CASE XX.—Mrs. S., aged seventy-five years, had an ulcer on the left leg 15·0 centimetres (six inches) in diameter. It was deep and had callous edges; it had been present for fourteen years. She had recently been in bed in a base hospital for nine months, receiving routine dressings of Unna's paste, strapping *et cetera*. This had resulted in no improvement. She had no varicose veins. It seemed that she was a suitable patient on whom to test the effect of improving the arterial blood supply. Periarterial alcohol injection was performed under local anæsthesia. The ulcer was dressed with vaseline. At the end of one week the edges had become flattened out and the foul-smelling base covered with healthy granulation tissue. She was treated by a visiting nurse at home by the application of vaseline dressings daily. Within three weeks the edge had invaded the raw surface for a distance of 1·9 centimetres (three-quarters of an inch) all round. Skin grafting closed the ulcer rapidly (see Figure III).

CASE XXI.—Mr. S., aged thirty-six years, suffered from Raynaud's disease of both lower extremities and, to a less degree, of the upper limbs. There was no reaction to the Wassermann test. The right foot was shrivelled and cold and was alternately pale and blue. Pain in the toes was severe. Periarterial injection of the right femoral artery was followed by increase in warmth of the limb. The patient stated that the foot was more comfortable, free from pain and more easily moved. The improvement persisted for three weeks only, when the condition became as bad as ever. Ganglionectomy has since been tried in this case; to date it appears to have been successful.

CASE XXII.—Mr. D. suffered from Volkmann's contracture in the lateral and dorsal muscles of the right leg following a bad fracture of the fibula one year before coming under observation. The leg had been stiff and cold since the accident, suggesting some vascular involvement. The *dorsalis pedis* and posterior tibial arteries were palpable but small. The right foot was always colder than the left. Periarterial injection of the right femoral artery was followed by warming of the limb and increased movement. The patient volunteered the information that the limb felt easier and stronger two days after operation.

Summary of Results.

Four patients suffering from gangrene (three diabetic, one senile) were operated on with success. The operation for senile gangrene was an experiment and though the patient died the improvement in the limb on which operation was performed contrasted with the condition of the opposite limb, used as a control. It would seem feasible to perform the operation for the relief of early gangrene and, even when amputation is indicated, it is a useful preliminary.

Of four patients suffering from trophic conditions, including one well-defined Raynaud's disease, two had complete relief for one year and two had temporary relief.

In eleven instances severe ulcer of the lower half of the leg healed rapidly; in seven instances healing occurred with a healthy scar. In three of these cases skin grafting was performed.

One patient suffering from neuritis was improved. In two cases healing took place, but there was a recurrence at the end of three months. In one case a temporary improvement occurred. Two patients suffering from peripheral neuritis improved little, if at all. Improvement of the circulation resulted in one patient suffering from Volkmann's contracture.

No attempt is made here to disparage the use of the well known methods of treatment of ulcers of the leg, especially the œdematous, stagnant type, by Unna's paste *et cetera*, but it appears to me that a useful aid in the treatment of long-standing indolent ulcers is provided by the method described above.

Discussion.

It is maintained by some that the vaso-dilatation is entirely due to the liberation of histamine during the process of the operation. If that were so, the ulcers on which previous skin grafts had been attempted, and ulcers associated with compound fracture should have been expected to heal rapidly. While there is no doubt that, as Thomas Lewis[6] has shown, histamine plays a part in vaso-dilatation, it can hardly be invoked as the sole cause of the improvement in these cases. It seems probable that the vascular nerves play a part. This will be discussed later.

It has been suggested that the rational method of treatment in these cases would be a ramisectomy or ganglionectomy[7] of the appropriate sympathetic nerves. It will be obvious that some of the cases in which the injection treatment has been adopted hardly justify the more drastic procedures. That there are cases in which the ramisectomy operations would be indicated none will deny, but the object here is to indicate my results from simple operations on the peripheral artery.

Pain is relieved in some cases and not in others. This suggests that the pain may have different origins. Care was taken in all cases in which pain was relieved, to make sure that sensation was present in the skin on the inner side of the leg and foot, that is, that the saphenous nerve had not been damaged. In no case was anæsthesia present, yet the pain was relieved. Two possibilities present themselves: (i) That the nerve endings were relieved by the vascular changes brought about by the operation; (ii) that there was an interference with the conduction of pain impulses, possibly passing up the periarterial network; it was certainly not due to any cutting of the somatic sensory nerves.

In Case XV I injected the skin with "Novocain" and asked the patient to allow me to try out a few tests. To this he agreed. When the femoral artery was exposed and the saphenous nerve handled he felt shooting pain down the inner side of the leg, but when the arterial sheath was taken up in forceps he complained of a sudden cramping pain in the leg at the site of the exposed artery. There can be no doubt that vaso-sensory fibres exist and that possibly we may regard a blood vessel as a hollow viscus capable of giving rise to pain under conditions of altered tension within its wall. When substances have been injected intravenously one has noted that patients complain of pain along the course of the vein when the solution has been rapidly injected.

From these experiments it appears probable that in man there is a vaso-sensory mechanism which would explain many other vascular pains, such as may be associated with embolism, intermittent claudication *et cetera*. It may be that there is some local mechanism on the wall of the artery—in the nerve net—for the regulation of the calibre of the vessel and that interference with this network upsets the reflex arc. Certain it is that we are not simply cutting off all vasomotor fibres in these cases, as the femoral artery receives some at least of its vasomotor fibres from the peripheral nerves in its neighbourhood. These fibres probably join the peripheral nerves as *rami communicantes* from the sympathetic system.[8] [9]

Figure I illustrates a dissection of the femoral artery in Hunter's canal and shows a branch of the saphenous nerve which I found constant in four subjects dissected. This nerve passes to the femoral artery and is apparently not the only one, as Poirier described the nerve to the femoral artery as often[10] coming off from the third lumbar nerve direct, at other times supplying the artery in the pelvis just above Poupart's ligament. It will be observed that the saphenous nerve is a sensory cutaneous nerve.

Figure I.
Ulcer of leg of fourteen years' duration (Case XX), before operation.

These small nerves which pass from the peripheral nerves to the main arteries in the body are not fully understood. No anatomy text book gives more than passing mention to them, yet Kramer in 1913 demonstrated in a series of dissections that they are constant in the limbs.[11] The current idea that the motor supply to an artery consists simply of a continuous plexus on its wall and arises from the sympathetic system in association with the main arterial trunks is not quite correct. It is well known that stimulation of a peripheral nerve is followed by vaso-constriction and so it is assumed that constrictor fibres, probably from the sympathetic by-way of the peripheral nerve, convey the impulses to the artery.

On the other hand, it is known that after section of a large nerve such as the sciatic, and allowing a certain time for degeneration to occur, further stimulation of the distal end of the nerve causes vaso-dilatation. Bayliss[12] regarded these vaso-dilator fibres which appear to pass to the hind limb

as being present in the posterior nerve roots (antidromic fibres). Stimulation of the posterior nerve root leads to vaso-dilatation. Langley has shown that these antidromic fibres have the same peripheral distribution as the sensory peripheral fibres.[13] The study of the control of the circulation in the skin, however, is full of difficulties and there is much investigation required to complete our knowledge of this subject.[6]

FIGURE II.

Same ulcer as shown in Figure I, three weeks later, showing the flattened edges, healing well following periarterial injection.

In the operation of periarterial stripping or alcohol injection only a small segment of the artery is interfered with and, as far as can be ascertained, no damage is done to the nerve passing from the femoral nerve to the artery. If the resulting phenomena are of nervous origin, it must be assumed that either motor or sensory fibres on the artery are cut. That there are sensory fibres on the vessel or intimately associated with it would appear to be suggested by our experiments on human subjects. An experiment by O. Forster in which he stimulated the digital artery of the little finger of a patient affected with a rupture of the three lower roots of the brachial plexus distal to the connexion with the stellate ganglion, appears to indicate that an accessory pathway on the arteries exists.[14] The patient felt pain on electrical stimulation of the exposed digital artery, whereas the stimulation of the digital nerve evoked no response.[15] Deep pain sensation was also appreciated in this case along the ulnar nerve distribution to the hand and along the inner side of the forearm.

A fact which suggests that the precise details of pain conduction are not understood is the presence of vague burning sensations in the face after section of the sensory root of the trigeminal nerve. Despite anæsthesia of the face to touch and other stimuli these patients often complain of a sensation of the face being toasted. In one patient under my care this was associated with definite hyperæmia of the face. Since flushing of the face occurs on stimulation of the sympathetic nervous system and pallor after removal of the sympathetic supply, it seems reasonable to assume that an intrinsic vascular sensory mechanism accounts for the toasted feeling complained of. The facial nerve sensory supply as seen in herpes of the geniculate ganglion type does not conform to this distribution.

The presence of elaborate structures in the artery wall, similar to the Vater-Pacinian corpuscles seen in other parts of the body where they are regarded as sensory in function, lends credence to the view that extensive sensory connexions on the artery exist.[17] There is no evidence of any long nerve fibres ending in the arterial wall, but simply a nerve net with nodes which apparently are not nerve cells. The musculature of the arterial wall appears to be supplied with many non-myelinated fibres, whereas many myelinated fibres pass in the *tunica adventitia*.[18] [19]

In my earlier cases a period of vaso-constriction occurred and the hyperæmia of the limb developed in some hours. This is the experience of other operators in this field. In my later cases hyperæmia was produced almost at once. Is it possible that the injection of the muscular coat of the vessel causes vaso-constriction and the application of small amounts of alcohol to the adventitia, not interfering with the muscular layer to a great extent, is responsible for the immediate hyperæmia? Haberland has shown that stripping the femoral artery in dogs, if carefully performed, produces no vaso-constriction, but immediate vaso-dilatation. He concludes that damage to the *tunica media* is responsible for vaso-constriction.[20]

It would appear that a neurectomy is virtually performed, for section of the adventitia of an artery reveals nerve elements, and alcohol is destructive to nervous tissue.

I could not demonstrate the bilateral changes which Lériche describes and prefer to regard the action of the operation as being confined to the limb operated on.[21] Several patients have since reported that the affected leg is warmer than the other when both are exposed to cold.

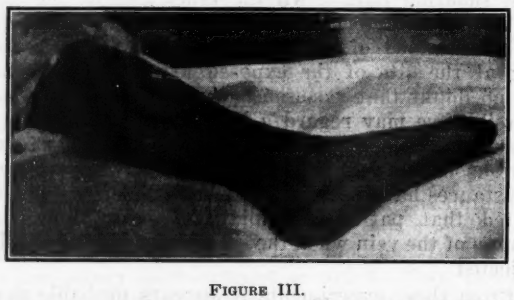

FIGURE III.

Same leg as shown in Figures I and II, two weeks after Thiersch skin-grafts had been applied, and six weeks after periarterial injection. The ulcer is now completely healed.

It is realized that there may be a psychic element in the results, especially when one bears in mind the intimate relation of the sympathetic system to the emotional centres, and the anatomical evidence[22] of probable centres for the sympathetic system in

the hypothalamus. Nevertheless, I regard the weight of evidence from animal experiments and from the effects of the operation on human beings[23] with whom the possible results were not discussed. as favourable to some physical and mechanical inter-

FIGURE IV.
Femoral artery, showing medullated and non-medullated fibres entering the arterial sheath. × 3.

pretation. At the same time I realized that "there is not a disease from migraine to cold feet which has not been treated by periarterial sympathectomy" [24] and that the claims of some enthusiasts await confirmation. I agree with Liek[24] when he states that the only conditions in which it is of use are functional disturbances such as angiospasm, if he includes under that term all those cases of chronic intractable ulcers such as I have seen respond to this treatment when all the time-honoured methods have failed. While appreciating the fact that there are many other factors at work in nutritional disturbances of the limbs as seen in the cases described in this paper, and as also appear in Raynaud's disease,[25] it seems worth while to employ a minor operation which, though empirical, appears to alleviate pain and accelerate the healing processes.

Conclusions.

The following facts and their discussion, while not directly bearing on the results of periarterial injection, suggest an explanation of the phenomena observed.

It is an interesting anatomical fact that the small arteries of the fingers and toes have a comparatively large nerve supply. The ulnar nerve gives off two large branches to the ulnar artery, the principal cutaneous artery of the hand, one just above the wrist and another higher in the forearm. Also the digital nerves give off well marked branches to the digital arteries in the fingers. These nerves arise from both median and ulnar nerves in the hand.

FIGURE V.
Femoral artery, showing its adventitia cut and a branch of the saphenous nerve passing to it at the lower end of Hunter's canal. Natural size.

The femoral artery, as we have seen, receives a fairly large branch from the saphenous nerve in Hunter's canal. Further down the leg the accompanying cutaneous nerves give off branches to the

arteries, for example, the obturator nerve near the knee.

It is significant that a large nerve supply to the peripheral arteries arises from sensory peripheral nerves. This fact is possibly related to the so-called trophic changes occurring in the hands and feet after section of the chief sensory nerves to these parts. The trophic changes are most marked in the most peripheral structures, for example, the ends of the fingers and toes. The well known, intractable, painless whitlows and perforating ulcers are also examples.

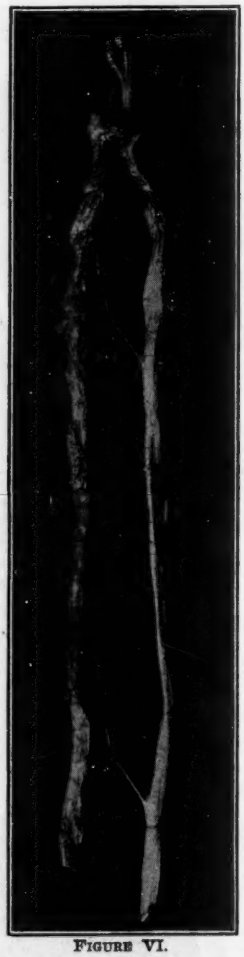

Figure VI.

Ulnar nerve supplying two large branches to the ulnar artery just below the elbow and proximal to the wrist. Histological section proves that medullated and non-medullated axones are present in the small nerve.

The peripheral arteries have the richest nerve supply from the peripheral sensory nerves. There must be some physiological reason for this anatomical fact.

The following history illustrates the common finding in cases of injury to a peripheral nerve.

My nurse, aged twenty-six years, sustained a fracture of the left radius and ulna at the middle of the forearm. She felt sudden pain at the time of fracture, shooting down the ulnar side of the hand and along the little finger and the ulnar side of the ring finger. After the bones had been lightly splinted it was observed that the little finger and the ulnar half of the ring finger of the affected limb were 1·7° C. (3° F.) hotter than the remaining fingers of the same hand. One may assume, therefore, that the arterial circulation in those fingers in which the pain was felt, was greater than in the other fingers. Patchy numbness alternating with intense hyperæsthesia was present along the same ulnar fingers. Weakness of the *interossei* muscles of the left hand was present.

The hyperæmia lasted two weeks, after which period the hot condition was gradually replaced by a coldness of the same two fingers and a slight cyanosis of the skin, together with a shiny appearance so well known in such nerve lesions. Wasting of the dorsal *interossei* muscles and slight flexion of the little finger then occurred. The little and ring fingers were easily moved by the flexor tendons. The patient recommenced her work when the fragments had united, one month after the accident. Despite the free use of the hand, the coldness of the ulnar fingers and the bluish-red, shiny appearance persisted. Patchy anæsthesia was present over the little finger, but nowhere was there complete anæsthesia to all forms of sensation. A detailed description of this condition is not necessary here.

This case indicates that the "trophic" conditions present are not explicable in terms of stasis due to muscle paralysis, since free movements of the fingers were possible from the commencement of the trouble. Even during her immobilization in plaster she practised movements and used the hand long before union was present. Splint pressure can hardly be invoked as a cause, as the only fingers affected were those supplied by the ulnar nerve, that is, where the initial shooting pains were felt. Anæsthesia does not appear to be an explanation, as there was never complete loss of sensation. In fact, hyperæsthesia was present for some weeks. Pressure of the fractured bone on the ulnar artery or the radial artery could not be the cause, as the ulnar artery supplies all of the fingers except the radial sides of the index finger and the thumb, which are supplied by the radial artery; the trophic lesions were confined to the little and ring fingers.[25]

There is one explanation which appears to account for all the phenomena.

Irritation of the ulnar nerve produced the vaso-dilatation of the ring and little fingers in the early stages of the condition by axone reflex. Such dilatation of an artery normally occurs reflexly, as has been shown by Lewis, by liberation of histamine in the skin, either as the result of trauma or by injection. That an axone reflex is the mechanism is shown by the absence of the spreading "flare" or red area produced by trauma or stroking the skin after section of the peripheral sensory nerve to the part. Degeneration of some fibres of the ulnar nerve then occurred, as shown by the patchy anæsthesia and wasting of muscles. The normal response of the vessels of the affected fingers could not then occur, as the nerve pathway for the axone reflex had gone. Such protective vaso-dilator response of the vessels of the digits to heat and cold is obviously necessary to prevent serious injury, hence the rich nerve supply of the peripheral vessels.

Further evidence of the vaso-dilatation which follows section of peripheral nerves, was obtained experimentally as follows:

A dog was anæsthetized and a circular incision was made through the middle of the thigh, passing through everything except the femoral artery, femoral vein and the bone. Careful suture of the muscles was then performed and the wound completely closed, leaving all peripheral nerves divided.

The temperature of the affected foot was 15° C. (27° F.) higher than that of the other three feet and of the affected thigh above the section. Strong pulsations of all the cutaneous large arteries could be felt on the foot and leg below the section. The limb remained quite healthy for eleven days, when the animal was killed and material removed for histological examination. Detailed reports of this are not yet available. The temperature of the affected leg, however, began to fall in the last day or two of the observations.

It might be argued that products of trauma caused the rise of temperature of the affected limb. That is probably true, but why was the general temperature so different from that of the affected limb, seeing that an efficient circulation was maintained? Sepsis was not the cause, as the rise of temperature occurred at once following operation.

It appears likely that the liberation of H-substance of Lewis or the mere trauma of the sensory nerves was responsible for reflex vaso-dilatation which gradually diminished as more and more connexions with the arterial trunks degenerated. It does not appear possible to explain the observations in terms of central antidromic impulses causing vaso-dilatation, since the sensory nerves were cut off from their cell stations in the dorsal root ganglia.

Another explanation which might be employed is that the sudden cutting of the greater number of the vaso-constrictors left the arteries in a condition of dilatation due to lack of tone in the arterial musculature and that in the course of some days the arteries acquired tone not dependent on the constrictor nerves. Such a dilatation of the arteries of the limb is not observed, however, following removal of the known vaso-constrictors of a limb, by means of sympathetic ganglionectomy or ramisectomy *plus* periarterial stripping. I have never seen the temperature difference more than 4° C. (7° F.) in such cases. Further, in the latter cases the raised temperature persists, whereas in the animal in question, as well as in the patient with the ulnar nerve lesion, there was a progressive lowering of temperature after the initial rise had disappeared.

Lewis[26] [27] has shown that on the day following section of a sensory nerve, such as the ulnar nerve, the temperature of the anæsthetic finger is several degrees higher than that of the normal digits, also that the vaso-dilator response to cold is greater in the anæsthetic fingers than the normal ones. This reaction is reversed after an interval of time sufficient for the degeneration of the affected nerve, and the well known cold, blue fingers are observed. The normal vascular response of the anæsthetic digit is recovered, however, long before complete return of sensation.

A patient in the Melbourne Hospital, aged twenty-six years, suffered a complete brachial plexus lesion in the region of the trunks, sustaining paralysis of the whole of the muscles of the left upper limb and the usual anæsthesia of part of the arm, the whole forearm and hand. Trophic changes were not observed until several weeks after the injury. They then became very pronounced. Recovery of power occurred in the muscles of the arm in two years and of the forearm in two and a half years. The hand muscles are still wasted and paralysed. The stimulus first appreciated in the previously anæsthetic area was deep pressure. This was quite marked in the elbow region one year after the injury and at the wrist one and a half years after the injury; at this time the trophic changes in the fingers disappeared and the skin became quite healthy.

Two years after the injury there was no appreciation of light touch or pin prick on the fingers, yet the circulatory condition was normal. At present, two years and nine months after injury, sensation is gradually improving in the fingers, but the so-called epicritic sense is absent.

These facts suggest that vaso-dilatation is a protective mechanism subserved by the sensory nerve fibres. Such fibres give off a rich supply to arteries and, in the case of the saphenous nerve, the intimate association between the sensory fibres and the circulation of the limb is a suggested explanation of the peculiar phenomena seen in Case XVIII of our series. An axone reflex *viâ* the saphenous nerve would account for the aggravation of symptoms. The damage to the saphenous nerve was coincident with an increase in the vascular disturbance and as the damage was mended the nutritional condition improved.

The local vaso-dilator effects of stimulation of a sensory nerve are well known in the reaction brought about as the result of trauma; the protective function of this mechanism is obvious. Contrasted with this is the widespread tendency to vaso-constriction following stimulation of any part of the sympathetic system. The handling of a small segment of a large artery causes vaso-constriction in the vessel, not only at the site, but also along its whole length below that site (Lériche). This is in accord with my experience of the operation of periarterial injection. This could be due to an irritation of the arterial nerve plexus. Injection of alcohol into a dog's femoral arterial sheath produces constriction at the point of injection and spreading constriction down the whole length of the vessel (Figures VII and VIII). Presumably the periarterial plexus is responsible here.

Later, in human subjects, dilatation of the vessel occurs at a varying interval after the operation. This may be explained as due to the destruction of the local vaso-constrictor nerve fibres on the vessel wall and the preponderating influence of the vaso-dilator fibres below the site of injection, acting *viâ* the peripheral sensory nerve connexions with the artery, that is, by means of an axone reflex.

It will be observed that the largest nerve branch I have seen supplying the femoral artery arises from the saphenous nerve at the lower end of Hunter's canal and that alcohol injections are made above that site.

The apparent anomaly of a delayed reaction in periarterial stripping or injection requires explanation.

If, as Lewis suggests, vaso-dilatation following trauma is a local phenomenon (and there is good reason to think it is) and is due to the liberation in the injured tissues of histamine or some such substance which acts directly on the vessels, but also through the medium of sensory nerves on larger vessels at a distance from the injured part, then the rich connexions of sensory nerves with the arteries of the peripheral parts of the limbs would appear to have a profound physiological significance.

The healing of a clean wound is facilitated by the well known process of inflammation. Contrast with this the slow healing of a wound in a finger or toe which has been deprived of its sensory nerve supply for some time. There is a large amount of evidence supporting the view that histamine acts *viâ* the sensory nerves, that is, by axone reflexes; the study of the minute anatomy of the blood vessels and their peripheral nerve connexions is likely to be of value.

We cannot disregard the chemical elements in this phenomenon and it seems probable that we are dealing with a variety of responses (nervous and chemical) to trauma in such important structures as the periphery of the extremities. The nervous element is probably not simple, as there may be control of the vessel from the highest psychic levels to the lowest axone reflexes.

The trophic changes occurring in cases of poliomyelitis cannot, of course, be explained in terms of interference with the sensory mechanism. But in such cases it may be that the lateral horns of the spinal cord grey matter are in a condition of irritation while the neighbouring ventral horns are destroyed. Since the vaso-constrictor fibres (preganglionic fibres) have origin in the lateral horns, one would expect a condition of vaso-constriction in the limb in such cases. The improvement in the circulation in the limb following periarterial operation in these cases would suggest that vaso-constrictors are interfered with.

The effects on the circulation of the immobility due to muscle paralysis cannot be set aside.

No clear-cut explanation of the arterial hyperæmia following periarterial operations appears to account for all the facts, but I consider that important information will be obtained from the study of vascular reflexes in the peripheral parts of the extremities.

Animal experiments are at present being carried out. Histological work on arteries of limbs, the nerves of which have been cut at varying levels, is in progress. X ray appearances of arteries distended with opaque media and subjected to experiment are being studied. A detailed account of this work will be published later.

Summary.

1. A series of cases is reviewed to try and determine the value of the operation of "periarterial sympathectomy."

2. Beneficial results have been obtained in cases of incipient gangrene, ulcer of the leg of the non-varicose type, and in ischæmic contracture.

3. Temporary benefit only was obtained in a case of Raynaud's disease.

4. Little, if any, improvement was observed in cases of peripheral neuritis.

5. Definite evidence is available that healing is accelerated and that as a preliminary to skin grafting improved results will be obtained.

6. The effect of the operation is not lasting, a few months at the most being the maximum period during which arterial hyperæmia is present in most instances.

7. The presence of sensory nerves on blood vessels is discussed and the opinion formed is that the operation interferes with vaso-constrictors in the *tunica adventitia* of the artery, allowing a preponderating influence of reflex vaso-dilatation through axone reflexes. Chemical agents in the tissues, as histamine, probably play a part in this process.

8. Trophic changes in general are discussed and an attempt is made to account for these phenomena in terms of the nerve supply of the peripheral arteries.

9. The minute anatomy of the vascular nerves is mentioned and the comparatively large supply to the extreme peripheral arteries commented upon.

10. Recent animal experiments, not yet completed, are mentioned and some of the current literature on vascular nerve supply is reviewed.

Acknowledgements.

My thanks are due to Professor Wood Jones, Dr. Tiegs, Dr. Kilvington, Dr. Victor Hurley and Dr. Leslie Hurley for help and comment in the preparation of this paper. I am also indebted to the Melbourne University Council for monetary grant which rendered the animal experiments possible.

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Reports of Cases.

SECONDARY NEOPLASTIC DESTRUCTION OF THE THYREOID GLAND RESULTING IN MYXŒDEMA.

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Introduction.

WHILE it is well recognized that neoplastic destruction of the pituitary or adrenal glands is a possible cause of hypopituitarism or Addison's syndrome respectively, references to myxœdema resulting from malignant disease of the thyreoid are very scanty. Kaufmann (1929) says of cancer of the thyreoid that "*cachexia thyreopriva* is rare." MacCallum (1925) states that the growth of functioning metastases from a thyreoid carcinoma has been known to relieve myxœdema resulting from total thyreoidectomy performed for the primary growth. Boyd (1925) states that cases have been observed in which, while no deprivation symptoms followed the surgical removal of a thyreoid affected with malignant disease, myxœdema supervened on subsequent excision of functioning metastases. None of these authors, however, gives any specific references; and I have been unable to discover records of any such cases in my own survey of available literature. Moreover, most standard text books of medicine make no mention of malignant disease as a possible cause of thyreoid deficiency. The case described in the following report was remarkable in that myxœdema resulted from extensive destruction of the gland by a metastatic neoplasm.

Clinical History.

In August, 1927, the patient, then aged fifty-six years, attended hospital with a small tumour on the vulva. The tumour and the inguinal glands on both sides were excised; subsequent radium treatment was given. Histologically the vulval growth was a squamous carcinoma and the glands of one side exhibited early involvement.

The patient came under observation again in June, 1929. Her relatives stated that after her illness in 1927 she had remained well for eighteen months, but that since March, 1929, mental deterioration and an alteration in facial appearance had occurred. Mentally the patient had become apathetic and forgetful. Her features had become coarse, her head had enlarged and she had gained weight. For several weeks past there had been noticed a rounded lump on the head; recently incontinence of fæces had been present.

General examination at this time revealed a pale, moderately obese woman, with a large head and coarse, thickened facial features. Mentally she was apathetic, amnesic for recent events and disorientated for time and place. She had no control of the rectal sphincter. Examination disclosed no noteworthy abnormality of the thoracic or abdominal organs. A soft hemispherical mass, three centimetres in diameter, was present on the skull near the right parietal eminence, fixed to the bone, but unattached to the overlying skin. Inspection and palpation disclosed no evident abnormality of the thyreoid gland, which appeared to be of normal size and consistence. The soft tissues of the vulva and the inguinal regions were healthy. The left pubic bone appeared somewhat thickened to palpation. Vaginal and rectal examinations disclosed no abnormality. Beyond difficulty in eliciting all superficial reflexes, neurological investigation was nugatory. The lower limbs were moderately œdematous.

Skiagrams of the skull revealed thickening of the bones of the *calvarium* to 1·5 to 2·5 centimetres in width with no differentiation into cortex and diplöe; some irregularity of density of the thickened bone and several foci of bony rarefaction, the largest, 2·5 centimetres in diameter, corresponding to the palpable tumour on the skull. The pituitary fossa was normal. Skiagrams of the pelvis disclosed some thickening of the left pubic bone and acetabulum. Radiological examination of the long bones of the limbs revealed no abnormalities. A radiologist was of the opinion that the skiagraphic appearances of the skull and pubis suggested Paget's *osteitis deformans* rather than secondary malignant disease. On clinical grounds also it seemed improbable that the former vulval carcinoma would have produced remote metastases in the skull after eighteen months' quiescence, and without recurrence of the primary growth. The condition, therefore, was diagnosed provisionally as Paget's disease of the skull with supervening sarcomatous change; the latter provided a not unlikely explanation of the external palpable tumour and, by intracranial extension, of the mental changes also.

The patient remained in the same condition for the ensuing six weeks, but in the second week in August she began to suffer with attacks of abdominal pain and vomiting. Her general condition rapidly deteriorated and she died on August 28.

Results of Post Mortem Examination.

The right breast contained in its lower outer quadrant an indistinctly palpable mass. When this was dissected out it proved to be a firm nodular tumour about five centimetres in diameter, infiltrating the fat and underlying muscle, but unattached to the skin. This tumour had not been detected clinically. The axillary glands were not involved. Multiple, evidently metastatic, tumours were present in the lungs, heart, kidneys, pancreas, small and large intestines, *dura mater* and brain; one minute nodule was present in the liver.

External examination of the thyreoid gland disclosed slight enlargement, more noticeable on the left side. Section revealed extensive replacement of the organ by firm, but not hard, white, neoplastic tissue. This replacement was almost total in the left lobe, where only scanty remnants of the normal gland remained. The right lobe

was involved less massively, but the total amount of residual thyreoid tissue was small. The neoplasm was confined within the thyreoid capsule; there was no infiltration of nor adhesion to adjacent structures (Figure I). All other cervical viscera were normal.

The skull bones were unusually dense and there was no diplöic cavity. Projecting from the outer surface of the right parietal bone was a soft hemispherical tumour five centimetres in diameter, with subjacent deficiency of the bone. Several similar but smaller areas were observed elsewhere in the *calvarium*. Limitation of the time available unfortunately rendered it impracticable to remove the left pubis and hip joint, which, however, exhibited no external evidence of neoplastic disease. No other skeletal abnormalities were observed.

Histological Appearances.

The tumours in all organs involved exhibited similar characters. The bulk of the tumour tissue consisted of diffuse masses of large spindle cells with scanty stroma. A tendency to an alveolar arrangement of the cells was evident in places, especially in the cerebral metastases. Mitotic figures were plentiful. With van Gieson's stain the tumour cells stained yellow and were sharply distinguished from the stroma. This property of the cells, as well as their tendency to alveolar formation, left little doubt of the epithelial origin of the neoplasm, despite a strong general resemblance to spindle-celled sarcoma. In view of the possible origin of the growth from the squamous carcinoma of the vulva treated in 1927, a thorough search of many sections for prickle cells and cornification was made, but without success.

Examination of sections taken from the periphery of the mammary growth revealed lines of infiltration of the adjacent fat; it was observed also that the breast tissue was the seat of chronic glandular mastitis, with atypical proliferation of the acinar cells, hyperchromatic nuclei and the formation of minute cysts. The same changes were encountered in sections of breast tissue remote from the neoplasm.

In sections of the thyreoid was observed massive spindle-celled growth with little alveolar tendency (Figure II). Residual thyreoid vesicles, mostly distorted or atrophic, were scattered sparsely through the neoplastic tissue and were most numerous in parts of the right lobe of the organ.

Diagnosis.

The primary origin of this neoplasm is not at once apparent. The multiple tumours in the lungs, kidneys, bowel, pancreas, heart, skull and brain were evidently metastatic; none of these could be regarded as a probable primary growth. Three serious possibilities remain: (i) The vulval growth, eradicated in 1927, may have been the primary source of subsequent widespread anaplastic metastases; (ii) the thyreoid tumour may be primary; (iii) the mammary tumour may be primary. The first possibility cannot be eliminated on the ground of non-recurrence of the vulval growth, generalization from which may have occurred prior to its eradication. More important are the histological characters of the tumours. Whereas the former vulval growth had the usual features of squamous carcinoma, a thorough search of the various tumours present at the time of death failed to reveal any suggestion of acanthomatous characters. There are therefore no grounds for assuming the vulval growth to have been the responsible primary growth. In attempting to decide between the two remaining alternatives, tumour of the thyreoid gland or mamma, as the source of the neoplasm, we receive little help from the cytology of the growths, whose anaplastic spindle-celled tumour tissue may have had either origin. Several considerations, however, suggest the breast as the primary site. The presence of proliferative glandular mastitis in other parts of the breast and the macroscopic appearance of the mammary growth, with its peripheral linear infiltration of the fat and its involvement of the subjacent muscle, were so suggestive of primary carcinoma of the organ that this diagnosis would scarcely have been questioned if the thyreoid had not also been involved. That the breast tumour was larger than that in the thyreoid and that metastasis of a mammary cancer to the thyreoid seems more likely than that of a thyreoid cancer to the mamma, especially in the absence of any other metastases in the skin or subcutaneous tissue elsewhere, are minor and less cogent points favouring the mammary origin of the growth. It is concluded, therefore, that the tumour is an anaplastic mammary carcinoma with metastases in other organs, including the thyreoid.

During the last five months of life this woman had suffered mental deterioration, changes of facies and an increase in bodily weight. The mental changes were attributed clinically to neoplastic involvement of the skull and brain. The cerebral metastases observed at autopsy, however, were small, while the growth in the thyreoid had effected almost complete destruction of the gland. Retrospectively, then, it appears highly probable that the mental apathy, increasing obesity despite the presence of extensive malignant disease, and the thickened facial features were occasioned largely by progressive thyreoid deficiency. Unfortunately such developments were not suspected during life, hence no observations are recorded regarding the blood pressure, condition of the hair and other confirmatory details. My recollection of the general appearance of the patient, however, satisfies me that she actually did exhibit myxœdema developing as the result of neoplastic destruction of the thyreoid gland.

Summary.

A case of carcinoma of the breast is described in which (i) an inconspicuous primary tumour produced widespread metastases, (ii) the thyreoid gland suffered extensive replacement by a metastasis, (iii) myxœdematous changes supervened.

Acknowledgements.

I am indebted to Professor P. MacCallum for advice in describing this case and to Mr. C. J. O. Brown for access to the clinical records.

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EARLY ENDOMETRIOTIC INVASION OF THE BROAD LIGAMENT.

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THE solution of the several problems that beset the subject of endometriosis of the female pelvic viscera and connective tissues can be considerably facilitated by a study and publication of all early cases.

Endometriosis, when it has reached an advanced stage, so damages the viscera, so distorts by adhesions and cyst formation, that it is not easy to define the initial lesion. In THE MEDICAL JOURNAL OF AUSTRALIA dated November 9, 1929, I published an account of a very early case of endometriotic invasion of the wall of the sigmoid colon, which, however, was associated with considerable chocolate cyst formation of the genitalia. The present case is interesting because it presents a picture of ectopic endometrium almost at its initiation.

History and Clinical Examination.

The patient was a nulliparous spinster aged forty-six years. Her complaint was of a dragging pain in the lower abdomen and back, of two years' duration. During the previous three months she had become affected with sharp severe pain in the left iliac region; this occurred

two days before and two days after the onset of menstruation. The menstrual flow occurred at intervals of twenty-one days and lasted for seven days, but it was gradually diminishing. There was no history of any grave illness. Examination of her systems revealed nothing abnormal, but there had been some recent loss of weight. Pelvic examination revealed a uterus, normal in position, but studded with fibromyomata of moderate size. There were also some contraction and thickening of the left fornix and by the aid of a speculum the cervix could be observed to be slightly eroded around the orifice of its canal.

The case was regarded simply as one of fibromyomata, although the recently acquired dysmenorrhœa and the puckered left fornix should have suggested the possibility of endometriosis. The latter sign is peculiarly suggestive of endometrial invasion of pelvic connective tissue.

Operation.

At operation the uterus was found studded with fibromyomata; the left ovary was prolapsed and adherent to the left lateral aspect of the cervical portion of the uterus and to a small area of the adjacent broad ligament. The pelvic colon was associated with this adhesion, lying external to the ovary and attached to the base of the broad ligament. The base of the broad ligament contained a small, firm, fibrotic nodule measuring about two centimetres by one centimetre; there was some puckering of the surrounding peritoneum. The possibility of an early endocervical carcinoma was considered and dismissed. The left ovary was separated from its abnormal attachment; there was no sign of cyst formation or chocolate coloured blood; the adherent area of the ovary was roughened and bleeding, but not otherwise obviously altered.

A total hysterectomy and double oophorectomy were performed and a portion of the fibrotic mass in the broad ligament was removed. It is interesting to note that this last was an infiltration and was not encapsuled; the fragment was removed only by cutting with knife and scissors.

Histological Appearances.

Microscopical examination of the adherent surface of the ovary (Figure I) revealed an early superficial invasion by endometrial tubules and stroma. The lumen of the tubules were lined with typical columnar epithelium, but contained no blood. Similarly, the mass from the base of the broad ligament (Figure II) contained a few typical tubules and stroma embedded in dense fibrous tissue. There were no signs of ectopic endometrium elsewhere in the pelvis.

Discussion.

Studies of such young examples of endometriosis tend to give support to Sampson's transplantation theory of their origin. There are four main and important views held as to the ætiology of ectopic endometrial invasions.

1. The view sponsored by von Recklinghausen and Meyer attributes these odd "infestations" to a development in adult life of embryonic rests of the Wolffian or Müllerian systems. This mesonephric origin has not found support and may be regarded as abandoned.

2. It has been suggested that endometriomata arise as a metaplasia of peritoneal epithelium which, having a common origin with the germinal epithelium of the ovary from the epithelium of the primitive cœlomic cavity, is supposed to retain some measure of developmental potentiality. During the period of active sexual life this may awaken with the result that there appear differentiated structures similar to those which it produced during embryonic life. Thus the germinal epithelium of the ovary is supposed to penetrate into the ovarian stroma, there to reproduce the endometrium of the Müllerian system which developed from its prototype in the embryo.

3. King, of the University of Melbourne, has put forward the view that some at least of endometriomata, especially of the ovary, arise from the *corpora lutea*.

4. Sampson's theory is that they arise from the grafting on to the ovary and occasionally other viscera, of fragments of endometrial epithelium carried with menstrual blood to the pelvis by a retrograde flow through the Fallopian tubes. It should always be remembered that Sampson demonstrated endometrial tissue lying in both blood and lymph channels and therefore admitted the possibility of other means of dissemination.

The condition herein described can, I believe, be interpreted as a primary endometrial invasion of the ovary with a secondary infiltration through an adhesion to the cellular tissue of the broad ligament. A very brief study of endometriosis impresses upon the mind the intense invasive property of the endometrial cells in this condition, so that there is nothing strange in postulating an invasion through the peritoneum to the underlying cellular tissue. The endometrial growth upon the ovary was quite superficial and had not penetrated at all into the stroma.

Presumably the ovary, having received upon its surface a splash of menstrual blood carrying a fragment of endometrial epithelium, became, perchance, prolapsed and became adherent to the posterior surface of the broad ligament in the position in which it was found at operation. This graft survived and by growth invaded the broad ligament to create there the typical hard, fibrous infiltration containing scattered endometrial tubules. The absence of cyst formation is probably explained by the youth of the endometrial invasion and also by the fact that the patient was on the threshold of her menopause.

It is possible to postulate a reverse process, that the broad ligament nodule was an extension direct from the uterine endometrium and the ovarian invasion secondary to this. This seems unlikely because the nodule was separated from the uterus by a small interval and it adjoined the cervical portion of the uterus which contains no endometrial tissue. The explanation based on the assumption of a primary endometrial implantation upon the surface of the ovary seems clearer and easier of acceptance than either of the alternative suggestions. The ectopic endometrium in this case certainly had no connexion whatever with a *corpus luteum* and it is difficult to believe that it was metaplasic in origin.

These early examples of endometriosis offer the most fruitful material for study; the condition is seen in a very early stage of development and uncomplicated by the destruction and adhesions that are manifest later. They apparently lend support to Sampson's views which are further substantiated by the following facts: (i) Endometriosis never occurs in the male. (ii) The incidence of endometriosis is high. Sampson reports having found the condition at 43% of abdominal operations performed upon women between thirty and fifty years of age. (iii) The condition develops only during menstrual life. (iv) It is known that retrograde menstruation occurs, so that blood and fragment sof endometrial epithelium and stroma are conveyed to the pelvic cavity. (v) Implants most commonly occur upon the ovaries, which are in contact with the abdominal ostia of the tubes. (vi) Implants are often associated with uterine morbidity, such as retroflexion or fibromyomata, that may induce a back flow of menstrual blood. (vii) The histological appearances of the implants are in accordance with Sampson's views. (viii) Cron successfully cultured tissue *in vitro* of cast off menstrual mucosa. (ix) Jacobsen succeeded in transplanting uterine mucosa of a rabbit into the peritoneal cavity of the animal. (x) Endometriosis has occurred in abdominal scars following operations in the course of which the uterine cavity was opened, for example, Cæsarean section. (xi) Endometrial implants occur in the vaginal wall following lacerations during parturition; this fact is impossible of explanation either by the theory of metaplasia or of luteal origin.

Perusal of Cron's account of his tissue culture which was published in the *American Journal of Obstetrics and Gynecology* in 1927, does not make it quite clear whether he actually succeeded in culturing epithelial tissue, but there is no doubt that some of the cells of endometrial fragments survived and grew in the culture medium. The Physiology Department of the University of Adelaide has recently experimented successfully with tissue culture and it is hoped as soon as possible to repeat Cron's work and to endeavour to establish cultures of endometrial epithelia and stroma.

Reviews.

THERAPY BY MOVEMENT.

THE author of "Shorter Convalescence" acknowledges in his preface the inspiration which he received from a remark by Sir Thomas Horder: "No amount of massage, and no amount of electrical stimulation of whatever kind has the same physiological value as the natural movement carried out by the patient under supervision and careful guidance. This is a principle that should never be lost sight of." This statement has become almost a truism in treatment and we feel has suffered in its application from excessive familiarity.

The present work will tend to bring the treatment of disabilities of the muscular and nerve mechanisms back into line with the scientific truths underlying this statement more than anything we have read. In fact it would not be an exaggeration to say that the work is the most perfect example of a realization of this ideal that we have had the good fortune to read. In every instance the author has availed himself of the latest authoritative work on muscle and nerve physiology as a basis for his deductions. He admits that numerous quotations are included *verbatim* in the text and claims that such new ideas as he has attempted to describe are accordingly given an authoritative setting. It would be difficult to select more appropriate quotations than those he has included, and they have been used with such discrimination that the continuity of the text is maintained.

It is impossible in a short review to make adequate reference to the many sound physiological conceptions which are incorporated and which would serve to bring one's knowledge up to date. The subject matter of the work is well paragraphed and a critical examination fails to disclose one statement which is not in accord with the consensus of opinion of modern writers. The title of the work fails to suggest its true value to the student, masseuse and practitioner, none of whom should fail to have a copy on their shelves. We feel sure that it is a book that will be read not once, but many times, and that it will repay such frequent scrutiny.

THERAPY IN DISEASES OF THE EAR, NOSE AND THROAT.

"A TYRANNICAL publisher limits the number of words, thus creating in the writer a fellow feeling for the hero who attempted to write the Lord's Prayer on a threepenny piece." These words are an extract from the "Author's Note" or preface to "Modern Treatment of Diseases of the Throat, Nose and Ear," by H. Lawson Whale, and in view of the excellence of the work, may be fittingly quoted.[2]

The work in question is divided into four sections, the first, a general survey of "Methods Old and New," the second, third and fourth deal respectively with diseases of the throat, nose and ear. In each of these sections, again, the various subjects are systematically considered, an outline is given of the opinions of modern teachers and exponents, with able and apt criticism by the author, followed by brief and systematically tabulated conclusions. At the end of each section is given a table of references.

Throughout the work the individuality of the writer is evident, and is such as to inspire a sincere respect for his experience and views, although some practitioners may not be in accordance with certain of his very definitely stated opinions, such as "apart from malignancy, the value of diathermy for tonsillectomy in the ordinary sense is absolutely unproved." For nasal operations, such as submucous resection of the nasal septum, the author strongly advocates general anæsthesia.

Including the index this little work occupies a mere 128 pages, and for its size contains a wonderful amount of useful, necessary and up-to-date information, covering a very wide range, and presented in a systematic and attractive manner. It should form a very useful addition to any medical library, and indeed, leaves with the reader a desire that the author will elaborate his work into something that will afford him scope for a more extensive production on similar lines.

EPIDEMIOLOGY.

THE most recent member of the Anglo-French Library of Medical and Biological Science to appear is entitled "Epidemiological Essays," by F. G. Crookshank.[1] This volume consists of a series of papers varying from a philosophical discussion on why time flies to a plea for more thorough, simple and practical nursing management of acute pneumonia, but mainly concerns itself with epidemic studies of influenza, encephalitis *et cetera*.

The author's principal theses develop the modern application of epidemiological principles as set out by Hippocrates. Whether one agrees with his comments or not, the seasonal and climatic influences on epidemic disease are deserving of intensive study.

Crookshank upholds the value of field observation rather than laboratory studies; he is interested in the French school which considers human form as the expression of human function—of functional reaction to *milieu*—and contends that the solstices, especially the æstival, and the equinoxes, especially the autumnal, are associated with serious epidemics, influenza, poliomyelitis and encephalitis, and even increased incidence of duodenal ulcer and pernicious anæmia.

Many interesting observations, historical and clinical, are made on influenza and on encephalitis. For influenza he claims a prevernal and post-autumnal equinoctial incidence, a ten or eleven year cycle and a thirty-three year periodicity, and, going further, would explain this behaviour by known variations in terrestrial magnetism and sunspot activities, a revival of the telluric or cosmic influences in which he claims may yet be obtained a glimpse of truth in the study of concurrent series of phenomena. Long forgotten epidemics, the "Trousse-Galants" of 1528-29 and 1545-46, are discussed and their identity with neurotoxic influenza suggested.

In his chapter on achrodynia he applies the term to pre- or post-influenzal neuritis. It may be noted that evidently the term acrodynia or epidemic erythema should not be applied to the "pink" disease first described by Sweet, of Adelaide, though considerable clinical resemblance exists. Epidemic encephalitis he appears to regard as one manifestation of the Heine-Medin disease, "infantile paralysis" being another, and frequently so-called "botulism" still another. Epidemic encephalitis he contends is not a new disease.

Crookshank supports Hamer in his advocacy of the "epidemic constitution" of certain years noted by Sydenham.

However much we may agree or disagree with many of the author's statements, the essays make excellent reading and are certainly provocative. They should be an excellent corrective to the excessive dependence on laboratory evidence and a stimulus to the exercise of practical wisdom by the practitioner. The essays may be considered as caviare for the philosophic rather than the "boiled and roast" to which Dr. Scot Skirving alludes. The book is hardly to be recommended to any to whom "bills and babies" are the chief interest of life.

[1] "Shorter Convalescence," by Lieut.-Colonel James K. McConnel, D.S.O., M.C., with a foreword by Sir Robert Jones, Bart., K.B.E., C.B., F.R.C.S.; 1930. London: William Heinemann (Medical Books) Limited. Crown 8vo., pp. 144. Price 5s. net.

[2] "Modern Treatment of Diseases of the Throat, Nose and Ear," by H. Lawson Whale, M.D., F.R.C.S.; 1930. London: Jonathan Cape; Sydney: Angus and Robertson. Crown 8vo., pp. 128. Price 5s. net.

[1] "Epidemiological Essays," by F. G. Crookshank, M.D., F.R.C.P.; 1930. London: Kegan Paul, Trench, Trubner and Company, Limited. Demy 8vo., pp. 146. Price: 7s. 6d. net.

The Medical Journal of Australia

SATURDAY, MARCH 21, 1931.

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PROFESSIONAL SECRECY.

THE basis of the practice of medicine is the confidence of the patient in his physician. The patient cannot expect that the physician will understand the nature of an illness or know what remedy to apply unless he is made acquainted with the whole history of the malady. The wise patient does what he can to marshal the facts for the scrutiny of the physician and he does not demur when the latter finds it necessary to inquire minutely into the patient's mode of life, to ascertain what illnesses he has encountered, to discover, for example, whether he has worshipped at the shrine of Venus or Bacchus and whether the worship has been rewarded by the deities in question with pathological mementoes of the several pilgrimages. The patient would not be content to do these things did he not know that the physician will always lock up the details of the inquisitorial interviews in the "safe and sacred repository" of his memory, in other words, that he will be true to the Hippocratic oath. The clause in the Hippocratic oath relating to this question is as follows:

> Whatever in connexion with my professional practice, or not in connexion with it, I may see or hear, I will not divulge, holding that all such things should be kept secret.

A medical practitioner is sometimes compelled by judges in courts of law to divulge information gained in his professional attendance on a patient. He does this under protest and no blame can be attached to him. In no other circumstances can he be compelled to betray his patient's confidence. If the patient gives him permission to narrate his history, it is quite another matter. In these circumstances it is possible that the medical attendant would be wise to have the permission stated in writing. Some patients are persuaded without difficulty to present themselves for demonstration at a meeting of medical practitioners and are content to have their illnesses, past and present, discussed and their bodies examined. Here, of course, they appear before a body of men and women each of whom subscribes to the Hippocratic oath. Even in these circumstances but little information is given as to the patient's identity, his name is probably not mentioned and his address is not stated. When clinical reports of patients' histories are published in medical journals, the patients' names are not given and all statements by which they can be identified are expunged.

It is obvious that if the medical practitioner in private or hospital practice feels bound to respect the confidence of his patient, the same obligation rests on hospital authorities who may have the patient in their care, and on nurses who may be charged with attendance on him. It would be ridiculous if, while the medical attendant is expected to refrain from discussing the patient's condition with anyone, the hospital staff was at liberty to give information to the curious. Yet this is apparently the accepted view in some places, particularly in regard to accidents. In the newspapers are to be found every day the names and addresses of injured persons and details of their injuries. Much of this information is obtained from the hospitals. Perhaps newspaper reporters are somewhat to blame. It is admittedly necessary that accidents should be reported in the daily press—as a warning to others if for no other reason. But that full description of injuries should be given is, to say the least of it, in bad taste. It is our firm contention that no detailed information of persons injured or of injuries received should be given by hospital authorities without the consent of the patient. When resident medical officers give information of this kind, they break the Hippocratic

oath. In a certain large town a young man was recently injured at a sports meeting. He was taken to the local hospital and admitted by a probationary nurse. This young woman became very interested in the patient, wanted to know about the event in which he was injured, whether anyone else was hurt, who the patient was and so forth. She excused herself for a moment and on her return to attend to the patient, informed him that she had earned ten shillings for herself by telephoning all the details to a newspaper office. The patient unfortunately took no steps to have the nurse reprimanded.

It is high time that something was done to put a stop to this sort of thing. Many patients will not object to seeing their names in the papers and to having their injuries described, any more than they will refrain from giving a full and embellished report of their hospital experiences to their back-yard neighbours when they return to their homes. Others, however, are sensitive and resent publicity. The feelings of these should be considered. The newspapers will publish what their reporters are told by those in a position to know the facts. The censorship must come from the hospital authorities. Perhaps a patient who feels aggrieved will take the matter up and something may be done; this type of patient, however, will be likely to scorn the publicity of an inquiry just as he loathes the newspaper publicity in the first place. If medical superintendents could be made to see that they as chief administrative officers are really answerable for the ethical standards of their institutions, they would make definite recommendations to the boards of management.

Current Comment.

SILICOSIS.

For many years increasing interest has been taken in South Africa and Australia in the industrial hazards of mine workers. In South Africa a distinguished band of investigators, among whom Watkins-Pitchford is perhaps the most prominent, has done much towards the solution of the many problems of pneumonokoniosis. On a more modest scale progress in the study of this elusive disease has been made in Australia, notably by H. G. Chapman and S. A. Smith, who carried out an exhaustive investigation at Broken Hill some ten years ago.

The disease processes which are included in the generic term pneumonokoniosis, are all interesting to the investigators of industrial disease. But the most important and most baffling of the group is that caused by the inhalation of silicon dioxide, commonly known as silica. Miners in hard rocks, especially in quartz, granite and sandstone, are subject to this disease. To be nocuous, the silica must be chemically uncombined. There is much evidence to show that the dust of clay, shale, slate and limestone, in which the silica exists as a silicate, is not harmful to the lungs of man. Similarly, coalminers working in coal only are subject to no special industrial risk. They inhale into the pulmonary tissues large quantities of coal dust which impart to the lungs the characteristic blue colour of anthracosis, but cause no apparent damage to function. Some confusion has existed in regard to the pulmonary hazards of coalminers, due chiefly to the fact that these men have frequently worked in quartz and sandstone prior to accepting employment as coalminers. Moreover, many miners are required to blast through rocks containing free silica in order to reach the coal seam.

Recently, T. H. Belt, a member of the staff of the Department of Pathology in the University of Toronto, has discussed the pathology of silicosis, basing his observations on the results of autopsies on seventeen persons dead of proven silicosis.[1] It will be remembered that up to comparatively recent times a purely mechanical conception of the lesion of silicosis held sway. It was believed that silica dust acted merely as a foreign body in the lung substance, stimulating the surrounding tissues to the formation of fibrous tissue. Gradually suspicion was cast on this explanation when it was realized, first, that large particles of silica caused no material damage to the organ, and secondly, that the lesion was slowly progressive and frequently advancing to its most damaging stage long after removal of the patient from the source of hazard. Watkins-Pitchford and his school, after an intensive study at the Transvaal Medical Bureau of an enormous number of patients (they made for a period of ten years an average of 34,890 examinations *per annum*), advanced in 1927 a complicated but engaging hypothesis to explain the specific action of silicon oxide. The substance of their views is that excessive quantities of crystalloid silica in particulate form enter the pulmonary lymph channels *viâ* the air vesicles. Entrance is effected by the phagocytic action of the endothelial cells which engulf the particles and transport them from the alveoli into the lymphatic spaces and channels of the lung. Particles above ten microns are innocuous, since they cannot be removed by phagocytosis, and particles smaller than one quarter of a micron are also held to be harmless, as they are too small to

[1] *The Canadian Medical Association Journal*, December, 1930.

stimulate the phagocytes to action. On arrival at its destination the silica becomes gradually encapsuled in small areas of fibrous tissue. This change is brought about by chemical action of some kind, since the silica particles are found to undergo slow solution. Now powdered silica may be dissolved by the simple process of boiling with an alkali. Thus waterglass is made by boiling silica with carbonate of soda. The South African view is that the silica, when ingested by phagocytes, takes on the fixative properties of waterglass and "mummifies" the dust laden cells, which now provoke fibrous tissue proliferation. When silicates, that is, silica combined with metallic oxides (for example, glass, brick or cement), are inhaled, the specific effects of silica are not produced. Such is the suggested mechanism whereby the clinical condition known as simple silicosis is produced. When tubercle bacilli gain entry into the lymphatic spaces, the silica particles aid and abet the organisms, facilitating their multiplication till the disastrous clinical state known as tuberculo-silicosis becomes evident.

Since the publication of the above views an attempt to explain the gradual disappearance of particulate silica has been made on the assumption that the silica is gradually dissolved in the tissues and thereby liberates an irritating substance which produces the fibrotic change. Dr. Belt inclines to this view after a study of the pathological material put at his disposal. He maintains that the tissue juices act upon the siliceous particles, converting them into a silica compound which is a protoplasmic poison. In those portions of the lung which contain recent accumulations of silica, the particles are readily visible under the microscope, while in those portions in which fibrosis has resulted from older deposits, the particles of silica are invisible. Thus fibrosis appears *pari passu* with the slow dissolution of silica dust in the tissues. Of course, the view championed by Belt is but a variation of the South African opinion and could not have been advanced without full appreciation of the South African work. Until the "protoplasmic poison" of the American and Canadian schools is isolated, the suggestion remains in the realms of fancy. Macdonald, Piggott and Gilder have recently submitted an explanation of the process in cases of so-called "acute silicosis." This is based on the assumption that silica is slowly dissolved in the alkaline fluids of the lung. The first state is the conversion of silica from a crystalloid to a colloid form. The colloid reacts with sodium bicarbonate to form sodium silicate, the excess of colloid becoming converted into a "gel." Reaction of sodium silicates with calcium and other salts yields precipitates of insoluble silicates, which are heaped up, so to speak, in increasing quantities until the normal process by which lung tissue converts crystalline silica into colloid is prevented mechanically. In this way silicon oxide accumulates unchanged in the lungs.

The still more difficult problem of the great frequency of tuberculous complications in silicosis is also discussed by Belt. He maintains that experiment only will solve it. When *Bacillus tuberculosis* is grown *in vitro*, the addition of silica does not enhance the growth, whereas the presence of silica in the lungs of living persons stimulates a profuse increase of these organisms. One explanation of this apparent anomaly is that the liberation of "toxic material" by the interaction of silica and tissue leads to repulsion of phagocytes, thus allowing unrestrained multiplication of tubercle bacilli which would otherwise be destroyed. Belt's view is that siliceous dust has the property of activating the natural increase of *Bacillus tuberculosis*. He examined many lungs microscopically and found that the areas in which fibrotic changes predominated were singularly free from tuberculous infection, whereas those portions in which free silica still persisted were frequently the seat of tuberculous infiltration. Hence he assumes that fibrotic areas resist invasion. Three patients suffering from early silicosis died of advanced pulmonary tuberculosis. *Post mortem* much dust was discovered in their lungs, but there was little fibrosis. Massive bilateral caseation was discovered in each instance. Hhere, of course, is the obvious fallacy (not mentioned by Belt) that all three patients may have had a primary tuberculous infection independent of silica. However, little criticism can be advanced against his general contention that if infection takes place early in relation to the pneumonokoniosis, caseation is a marked feature of the pathological changes of the lungs, whereas extensive antecedent fibrosis determines a reaction to superimposed tuberculosis which is marked by massive fibroid induration.

PREPATELLAR BURSITIS.

In view of the fact that many authors of text books recommend excision of a prepatellar bursa that has become the site of chronic inflammation, it is interesting to note a recent report on the conservative treatment of prepatellar bursitis by Louis Carp.[1] This author is concerned only with both acute and chronic inflammations ("housemaid's knee") producing a painful or non-painful swelling without calcification and with fluid of a non-purulent character present. In twenty-seven cases he aspirated the fluid, injected several cubic centimetres of half strength tincture of iodine into the sac, carried out vigorous massage over the bursa, applied adhesive strapping over the sac with the knee extended and applied a firm pressure bandage. In a little more than half the patients small amounts of fluid reaccumulated in an average time of ten days. This fluid was aspirated. Twenty-four of the twenty-seven patients were traced for an average period of sixteen months; they had no return of symptoms. The average time for disappearance of fluid in twenty patients was three weeks.

[1] *Surgery, Gynecology and Obstetrics*, January, 1931.

Abstracts from Current Medical Literature.

THERAPEUTICS.

Malignant Tumours of the Mouth and Throat.

FREDERICK A. FIGI (*American Journal of Roentgenology and Radium Therapy*, June, 1930) reports on a number of therapeutic agents used in the treatment of malignant tumours of the mouth and throat. The clinical value of some of these has been definitely proved and others are still in the experimental stage. Among the former may be mentioned irradiation by radium and Röntgen rays and surgical procedures, including excision either with scalpel or some form of cautery knife, electro-coagulation and the actual cautery. The latter include lead and the various vaccines and serums. The selection of the proper agent or procedure or the group of these to be used in a given instance, is just as essential as correct methods of administration. Such selection is dependent on a number of factors, for example, the situation and extent of the lesion, its pathological characteristics, whether or not it has been treated previously, and the age and general condition of the patient. Physicians are not entirely in agreement concerning the significance of these various factors or of the efficacy of the various therapeutic agents. In general, lesions of areas readily accessible, as about the lips, should be removed surgically. Those involving areas difficult of access, as the nasopharynx and the hypopharynx, should be destroyed with diathermy or treated with radium or Röntgen rays. Low grade epitheliomata and those of moderate activity should be excised or destroyed by the use of diathermy or the actual cautery, and the regional lymph glands removed subsequently. Very active epitheliomata and sarcomata should be irradiated. At times it is advantageous to supplement operation with irradiation and *vice versa*. Carcinomata of mixed tumour type should be excised. Lesions previously treated, especially with irradiation, must be dealt with more radically. The prognosis in these cases is, as a rule, less satisfactory. Treatment should never be instituted until a diagnosis has been established.

Auricular Paroxysmal Tachycardia and Calcium.

J. B. WOLFFE AND S. BELLET (*Annals of Internal Medicine*, January, 1931) report a series of five cases of auricular paroxysmal tachycardia, in three of which the paroxysm was dramatically arrested by the intravenous injection of calcium. In two of the cases electrocardiograms show the restoration of normal rhythm. The authors review briefly the methods used for the termination of attacks of paroxysmal tachycardia. These are essentially stimulation of the vagus either directly or indirectly or the use of such drugs as quinidine, digitalis, adrenalin hydrochloride, parathyreoid gland and various sedatives. The patients in the series under review were given calcium in the form of "Afenil" or calcium gluconate. The remedy must be injected slowly, about five minutes being required to inject twenty cubic centimetres. During its administration the patient complains of a sense of constriction in the throat, of a feeling of intense heat and sometimes of nausea. These symptoms are evanescent. Two of the patients received follow-up treatment, calcium lactate being administered by mouth in 1·2 gramme (twenty grain) doses three times a day. In discussing the mechanism of the action of calcium, the authors state that it acts on the heart muscle by promoting a state of tonic contraction. A theory recently advanced suggests that paroxysmal tachycardia may be a form of circus movement. The authors put forward the hypothesis that calcium, by promoting a state of contraction of the heart muscle, would increase the refractory period of the auricular muscle, thus tending to inhibit the formation of the ectopic impulse and giving the pace-maker an opportunity to reassert itself. The action of this drug would thus be analogous to that of quinidine.

Hyposulphite of Magnesium.

G. BOISSEL (*La Presse Médicale*, May 17, 1930) reports the results of the use of magnesium hyposulphite in anaphylactic states. In hay fever and spasmodic coryza four to six tablets (0·5 gramme) per day gave relief in a week; a similar result was obtained in twelve cases of asthma. In asthma, moreover, ten cubic centimetres of a 10% solution, injected intramuscularly, frequently relieved the paroxysm within ten minutes; and when this injection was repeated every four days, lasting benefit was obtained. In epilepsy, urticaria and chronic eczema some good results were noted, though these were less pronounced than in hay fever and asthma.

Hypertension.

G. E. BROWN (*Annals of Internal Medicine*, June, 1930) discusses the daily and monthly rhythm in the blood pressure of a man with hypertension. The patient was a man aged thirty-one; he estimated his own blood pressure at 7 a.m., 6 p.m. and 10 p.m. for nearly three years; at times he took it every hour. His physician verified the results from time to time. In hospital the diastolic blood pressure varied between 80 and 120 millimetres of mercury and the systolic between 160 and 210 millimetres. While the subject was at work blood pressure was lower during the summer (he worked as a steam fitter). Excitement raised the blood pressure and a rise occurred on Sunday evenings as a rule. Regular work was associated with a lower average pressure than occurred at week-ends. Restriction of protein and general dietary restrictions seemed to have no effect. Phenobarbital in doses of 0·049 gramme (three-quarters of a grain), given once, twice or three times a day, had no obvious effect, but potassium sulphocyanate in doses of 0·097 gramme (one and a half grains) given twice a day for some months seemed to be associated with a lower average blood pressure. The condition was one of uncomplicated hypertension.

Organotherapy.

E. NOVAK (*The Journal of the American Medical Association*, October 25, 1930) discusses some functional disorders of pregnancy and their treatment by organotherapy. Amenorrhœa of endocrine origin occurs in ovarian deficiency, hypopituitarism and thyreoid hyperfunction or hypofunction. It is, however, often difficult to distinguish these syndromes. Ovarian extracts, anterior pituitary and thyreoid extracts are used in the treatment of amenorrhœa supposed to be due to the above causes. Oral administration of ovarian extracts is worthless so far as reestablishing menstruation is concerned, and ovarian follicle hormone has given no constant therapeutic results. The oral use of anterior pituitary substance is probably without value at present. Thyreoid medication in suitable cases is probably the most reliable organotherapeutic measure for amenorrhœa of endocrine origin.

Polycythæmia.

C. MURPHY (*The Lancet*, December 6, 1930) describes a case of *polycythæmia rubra vera* and discusses the treatment. The patient was first examined in 1923 when eleven million red cells per cubic millimetre were found, in 1925 there were nine million and in 1927 eight million red cells per cubic millimetre with a hæmoglobin value of 125%. Benzol, sodium carbonate, irradiation of the long bones and venesection were tried with little benefit. For thirteen months 0·1 gramme phenyl hydrazine hydrochloride was administered per week; the systolic blood pressure fell from 168 millimetres of mercury to 142 millimetres and the diastolic pressure from 97 to 81 millimetres. The red cells fell to 4,500,000 per cubic millimetre with 80% hæmoglobin; the spleen remained large and tender and the characteristic cerise colour of the face and lips was still evident. In discussion it was recorded that X ray treatment applied to the long bones prior to phenyl hydrazine treatment was sometimes an advantage. Doses of phenyl hydrazine up to 0·1 gramme daily for three or four weeks can be given.

Pernicious Anæmia.

C. C. STURGIS AND R. ISAACS (*The American Journal of the Medical Sciences*, November, 1930) report further studies of the effect of feeding whole, chopped hog stomach (twelve to eighteen hours old), desiccated and defatted with petroleum benzine, to patients with true pernicious anæmia.

One hundred grammes of fresh stomach yielded from 11·7 to 15·0 grammes of the dried material. The average dose of 20 to 28 grammes daily was found to be satisfactory in inducing a remission, and seven to ten grammes were found to be a satisfactory maintenance dose. A safe dosage which has proved effective, is ten grammes for each million deficit in the red blood cell count. The reticulocyte response obtained with dried, defatted stomach was compared with that resulting from the use of liver extract. Of twenty-two patients carried to a complete hæmopoietic remission, the average count at the begining of the therapy was 1,800,000 per cubic millimetre and the average count at the end of 6·6 weeks was 4,300,000. The results of administering the mucous membrane and the muscle layer of the stomach separately suggest that there is present in the mucosa an enzyme-like substance which acts on proteins and liberates the active hæmopoietic principle.

NEUROLOGY.

Sciatica.

HENRI ROGER (*Revue Neurologique*, June, 1930) opened a discussion on the subject of sciatica at the recent annual meeting of the Neurological Society of Paris. He said that when a patient experienced pain in the leg he invariably thought of sciatica. Careful examination, however, might show that his pain had no connexion with the sciatic nerve; arthritis, osteomyelitis, myositis, phlebitis or other condition might be the correct diagnosis. In other cases, while the pain was of nervous origin, the sciatic nerve was not implicated. This was exemplified by *meralgia paræsthetica* (pain in the outer aspect of the thigh) and the pains of *tabes dorsalis*. All such affections deserved the term "pseudo-sciatica." Next, there were cases in which the cause of the pain was in the neighbourhood of, but not actually in, the sciatic nerve. Syphilis, tuberculosis, carcinoma and hydatid disease of the spine were examples. These might be termed "parasciatica." Then there was sciatic pain induced by known agents, such as alcohol, diabetes, varicose veins and injury, which was merely symptomatic. Lastly, there remained a large group whose causation was obscure, so-called rheumatic, arthritic or ordinary sciatica. It was with this last group that the writer specially dealt and which he divided into five subgroups: (i) Funicular sciatica or lumbo-sciatica, in which lumbago followed by sciatic pain, tenderness of the fourth and fifth lumbar vertebræ and spasm of the erector spinæ muscle were important signs; (ii) plexular sciatica or sacro-sciatica, in which pain was referred mainly to the region of the sacro-iliac joint and perhaps to the adductor muscles of the thigh (obturator nerve); (iii) truncular sciatica or neuro-sciatica, a common form which was illustrated by the sensation experienced after sitting on a cold stone and in which the well known tender points of Valleix and the sign of Lasègue (pain on stretching the nerve trunk) were obvious and the ankle jerk was abolished; (iv) muscular sciatica or myosciatica, a rare form, first described by Scandinavian writers, wherein the pain was confined wholly to the muscles clothing the posterior aspect of the leg; (v) cellulo-sciatica, also uncommon, in which pain occurred only on exertion and was located in the buttock and outer part of the thigh and wherein palpation disclosed shotty nodules in the subcutaneous tissues, muscles and aponeuroses.

General Paralysis and Tabes in the Balkan States.

L. STANOJEVIČ, of Belgrade (*Psychiatrisch-Neurologische Wochenschrift*, July, 1930) writing in regard to the immunity to general paralysis and *tabes dorsalis* supposed to be enjoyed by dwellers in the Balkan States, particularly Bosnia and Herzegovina, says this is incorrect and that these diseases not only occur in the Balkans, but do so in a form clinically and anatomically indistinguishable from that in other lands. He further expresses the belief that in any part of the world where syphilis exists, general paralysis and tabes will be found. In the matter of ætiology, however, he thinks that reduced resistive power on the part of the blood vessels of the central nervous system in some way predisposes certain individuals to parasyphilis. He cannot subscribe to the belief that biological variations in strains of spirochætes are responsible factors.

Syndrome of Benedikt.

SOUQUES, CROUZON AND I. BERTRAND (*Revue Neurologique*, October, 1930) give clinical and anatomical details of the history of a woman well known in medical circles in Paris, who had suffered over many years and had been examined from time to time by many distinguished neurologists, including Marie and Dejerine, and whose illness had been accepted by all as a typical example of what is known as Benedikt's syndrome. In short, she presented paralysis of the third or oculo-motor nerve on one side, with extensive, irregular, involuntary choreiform movements of the arm and leg on the opposite side. The point of importance is that hitherto Benedikt's syndrome has been accepted as being due to a lesion of the *crus cerebri*, implicating oculo-motor nerve roots along with the pyramidal tract. In the present case, however, serial microscopic sections of the mid-brain proved the *crus cerebri* to be quite intact; there was, on the other hand, a circumscribed, old-standing, sclerosed focus of softening in and confined wholly to the red nucleus and implicating oculo-motor nerve roots as they traversed the nucleus. The conclusion, therefore, is that views on the syndrome of Benedikt need revision, destruction of the red nucleus is the essential factor and that interference with the pyramidal tract in the *crus cerebri* is unnecessary.

Chorea.

R. NORDGREN (*Acta Pædiatrica*, December 16, 1930) from a study of chorea in the Samaritan Hospital, Stockholm, over many years, found that any increase in the number of rheumatic affections coincided with or immediately preceded an increase in the number of cases of chorea. And as further proving this relation between chorea and rheumatism he found evidence of rheumatism, past or present, in 193 out of 343 cases of chorea. Chorea may also follow other infectious diseases, such as scarlet fever and acute tonsillitis. In the author's series of 343 patients with chorea 218 were girls. As to age incidence, chorea arises most between the ages of five and fifteen years. Before the fourth year it is rare. The following details are instructive. Of patients three to six years of age nine were boys, twenty-nine girls; of those six to eight years, thirty-one were boys, thirty-eight girls; of those eight to ten years, forty-three were boys, seventy-seven girls; of those ten to twelve years, thirty-three were boys, fifty-one girls; of those twelve to fifteen years, nine were boys, twenty-three girls.

Bilateral Facial Spasm.

H. ROGER AND A. CREMIEUX (*La Presse Médicale*, December 13, 1930) record bilateral facial spasm as a typical example of a somewhat rare condition first described by Sicard. The subject was a man, sixty-five years old, who came complaining of attacks in which his eyes would suddenly close, making it dangerous for him to cross a street. On closer examination it was found that the attacks consisted of facial spasms occurring in crises. They began with contracting and relaxing movements of the frontal muscles. Next, after rapid opening and closing movements, the eyes would become firmly closed. A little later the play of spasm would spread over the entire face, inducing irregular movements of cheeks, nose, lips and chin, and altogether a most extraordinary grimacing. These movements would continue for half an hour to two hours and recur after a couple of hours' freedom. During the morning there might be no attacks, but after midday and following exertion or emotional disturbance they came in all their intensity. In other respects the patient was normal. From a study of this case and the few others on record it appears that apart from the tendency to affect elderly subjects the condition is obscure in its ætiology and pathology. No treatment has any effect and the condition is permanent. In one case Sicard recorded the experience that neither alcoholization nor even section of the facial nerve producing facial paralysis did more than temporarily subdue the spasmodic movements.

Special Articles on Diagnosis.

(Contributed by Request.)

XXXVII.
MINOR MENTAL INVALIDISM.

KNOWLEDGE usually bears two aspects—the absorbingly interesting academic of scientific theory, and the possibly more prosaic of actual practice. The former is beyond the scope of this article, which resolves itself into certain practical considerations of the diagnosis of the minor mental disorders.

The classification of the neuroses and psycho-neuroses is still under dispute. The finer diagnostic points are debatable and, if the experts disagree, where must the man in the street search for orientation? Although a brief *résumé* of certain well defined groups will be considered, it is advisable not to be tempted to search for a too exact nomenclature. A psychosis may be roughly regarded as a mental state in which a patient has no insight into his own condition, whereas in the neurosis he is aware of many deficiencies. This is not invariable, as in the early stages of a psychosis a patient may have considerable insight and be wrongly regarded as suffering from a neurosis. Whilst this is unavoidable it matters little as far as treatment is concerned, but to label a neurosis a psychosis is to risk disaster. The best plan is to give the patient the benefit of the doubt.

Minor mental invalidism may be classified under three headings.

Anxiety States.

An anxiety state is characterized by the predominance of awareness or expectancy, difficult to define, associated with a pronounced displeasure, recognized as fear. It is a mixed state. Restlessness is usually pronounced. Perception, sensation and consciousness are vivid. On the physiological side endocrine imbalance is seen in the increased output of the thyreoid and adrenals, causing stigmata akin to those of Graves's disease, such as dryness of the mouth, increased perspiration, clammy hands, increased pulse rate, digestive disturbances and general changes in metabolism.

The anxiety may be general or circumscribed. On the one extreme it attaches itself to every environmental and body phase; on the other it concerns a specific object. This latter type is known as a phobia. Fear of open or closed spaces, crowds, trains, trams, motor cars, the dark, meeting certain individuals *et cetera* are but some of an infinite variety. In all cases, owing to the fact that the amount of conscious thinking is fixed, these distractions lead to fatigue, lack of power of concentration, difficulties in memorizing and general intellectual grip, which bring the patient for medical advice.

Feelings of "tightness," numbness, emptiness of the head, together with tensions and paræsthesiæ throughout various parts of the body are very frequent. They can be logically regarded as a natural corollary to the perverted awareness mentioned above. The patient is too aware of his own bodily functioning, he is "listening in" to himself and misinterprets the feelings.

Obsessional States.

In the normal individual, thought, feeling and action are so perfectly balanced that any situation perceived is analysed, correlated and harmoniously synthesized into the personality (apperception); the appropriate emotion is felt and action proceeds smoothly and calmly. If, however, the synthesis is imperfect, then abnormal states must arise. A simple analogy will demonstrate one phase of this. A man at cross-roads has to decide on which road to travel; he reviews the pros and cons for each route, finds excellent reasons for and against travelling along all and is finally unable to decide on an itinerary. He has a surfeit of "yes and no." The process is fatiguing. A shopping excursion with its accompanying plethora of "yes-no" decisions is an admirable illustration of the development of psychasthenic reaction. In practice the conflicting tendencies are usually only apparent on analysis of the individual's psychic make-up and are dependent on his personality trends, temperament, beliefs, sentiments, ideals, family relationships *et cetera*. Symptoms follow three channels.

1. *Irresolution and Doubt*: He is unable to make decisions; he lacks interest and finds concentration difficult. Mental fatigue is a marked feature.

2. *Compulsive Acts*: In addition to the above he feels compelled to do things which he knows are not necessary, but which he feels are required. A bank manager may, for example, lock his safe many times before he is able to leave the building.

3. *Impulsive Conduct*: Instead of thought flowing freely to normal action it is blocked and not infrequently inappropriate lower types of reaction come to the surface. Torrents of abuse, howling, weeping, onanism may occur. The worried motorist who kicks his flat tyre will be reminded of this type of reaction. He knows that it is futile, but he does it none the less; the psychasthenic merely exaggerates the tendency.

Hysterical States.

One of the commonest coins in our emotional currency is sympathy. The hysteric spends his life in collecting them. The colourful symptomatology is largely based on motives which have as their basis the begetting of compassion. As a result, whilst the symptoms may be indistinguishable in many ways from those described under the headings "Anxiety States" and "Obsessional States," they differ in that, as Craig and Beaton so aptly write, "the hysterical patient is invariably at his worst in a compassionate environment, for any display of sympathy fans the flames of his disturbance." The types of hysteria are far too numerous to describe in full; the commonest reaction is that of generalized emotion, dominated by anger, fear, weeping, petulance, whining *et cetera*. A specific emotional response to one individual, for example, the attention of a doting mother who has made a rod for her own back, is very frequent. If the reader allows his mind to range through the possibilities of nervous and bodily functioning, he will find the hysterical counterpart —loss of memory, states of coma, convulsive phenomena, paralysis, anæsthesia. Every differential diagnosis must keep in the foreground the possibility of this condition. The chief clues are the possibility of a motive, the exaggeration in situations productive of sympathy, and the "sailing close to the wind" attitude; the patients threaten great harm but rarely effect it. When anæsthesias and paralyses are present they tend to follow the distribution of an idea rather than an individual nerve. For example, the former are classed as glove and stocking anæsthesias to indicate that the lesion follows the patient's conception of what a lesion should be, rather than one of true anatomy. The hysteric is very suggestible, a fact which is made use of in many diagnostic procedures. If the patient is asked to say "yes" when he is touched and "no" when he is not touched over an "anæsthetic" area, he will correctly inform you when not touched. In "paralyses" a "paralysed" limb may be made to move by distracting the attention elsewhere. The most difficult hysteric is the individual who has had considerable experience of hospitals and who has learned his lesson, so to speak, at school and who is able to simulate organic disease. However, even with these there is usually an "oddness" in the symptomatology which makes one suspect hysteria.

General Considerations.

It will be noted that the term "neurasthenia" has not been mentioned. As a *placebo* for patients there are uses, but the real significance is in the same category as the employment of the word "abdomenitis," to include such differing entities as an inflamed gall bladder or appendix. Even the text book classification outlined above must be used with caution as providing intellectual tags, no more, no less. Each patient really has an individual syndrome which differs from that of every other patient in some particular, much in the way as does his physiognomy. A correct diagnosis must entail the evaluation of all the factors leading to his psychological, nervous and physical make-up. An individual may be regarded as an edifice withstanding a storm. In order to form adequate buttresses, not only must the visible cracks be repaired, but

it is equally important to know the strength of the wind, that is, the environment, as it is to ascertain the state of the foundations, that is, childhood influences, temperament, character, ideals, sentiments and the like. Whilst in a difficult case this may entail the labours of Hercules, much may be done by a comparatively superficial examination on right lines. The following brief hints may be useful.

Heredity.

Although heredity is of apparent importance, training in childhood is a greater factor; the importance of heredity should be minimized accordingly. Too often, if inherited tendencies are noted and stressed, the patient is more despondent than ever.

Childhood.

Children tend to belong to one of two categories: the introvert and the extrovert. The sensitive, tender introvert is self-centred, prefers solitude to company, reading to games; he associates ideas so readily that a word may hurt more than a blow. Often introversion is the basis of an inferiority complex. Having discovered your introvert, the route to the neurosis is frequently clear sailing. The vicious circle is mapped out and appropriate advice can be tendered. The neurotic craves to be understood and the moment he feels you do understand, real therapy commences. Whether fixation on the father or mother has occurred will be clear during the discussion on childhood. Ages of walking and talking and the scholastic record are guides as to mental deficiency. A history of moodiness is a valuable aid in the exclusion of manic-depressive tendencies. Phantasy formation is often a marked feature of childhood and it is often exaggerated and continued beyond the normal age. It is worthy of investigation.

Conflict.

The neurotic has usually suffered so much at the hands of well-meaning but misguided advisers that he tends to hide his real worries. Blunt questioning will therefore fail. He fears the inquisitive. Presage your remarks with something likely to put him at ease: "We all have worries," "You know I only want to help you, and it's in confidence" *et cetera*. Then run briefly through the common causes of worry, such as religion, finance, family, domestic dysharmony, work. Sex should come last. By this means the patient is used to your questions before commencing on the most difficult inquiry and the risk of manufacturing a sex complex is obviated. When one considers that the majority of normal individuals have had some form of sex trauma in the nature of masturbation *et cetera* without any apparent harm ensuing, the danger which follows over-stressing of this factor is obvious. Repression may be usefully mentioned here. A damming back of normal activities, play, work, sex *et cetera*, leads inevitably to abnormal psychic tension.

Environment.

Conditions of work, possession of hobbies, sporting activities, circle of friends should be investigated in every case. A good example of the effects of environment is not infrequently seen in bush children who become shy and timid with strangers. Later, when forced to have more contact with reality, an inferiority complex develops.

Sleep and Dreams.

While it is often a moot point as to whether the neurosis or insomnia is the first to appear, the latter is undoubtedly a most important factor in the persistence of neurosis. A question as to dreams should be part of the routine, as recurring dreams may give a hint concerning underlying conflicts.

Physical Examination.

Little need be said of the physical examination except that it should be as thorough as possible. Any abnormality may have its effect in the neurosis syndrome. An organ inferiority is often the deciding factor in the formation of a neurosis. As an example may be mentioned one of my patients who had a congenital absence of one pectoral muscle. The recurring thoughts of his disability making him an "abnormal man" produced through the years an obsessional neurosis.

Examples of neuroses based on physical disease are surprisingly frequent. Chronic cholecystitis, achlorhydria with morning diarrhœa, chronic antral suppuration, visceroptosis, early pernicious anæmia, early *paralysis agitans* are some of the conditions recalled as associated with minor mental invalidism during recent actual practice. Psychotherapy was, in all, doomed to failure until the underlying lesion had been discovered.

Conclusions.

The diagnosis of a case of minor mental disorder requires time, thoroughness and patience, infinite patience. While it is tedious, there is the heartening thought that its accomplishment is in itself a not inconsiderable part of therapy. A common sense psycho-analysis on the conscious level as in ordinary conversation will do much to elucidate the make-up of the neurosis.

JOHN BOSTOCK, M.B., B.S. (London), D.P.M.,
Honorary Neurologist to Brisbane General Hospital.

Medico-Legal.

TINTER *versus* VALLACK.

IN this action the plaintiff, John Tinter, claimed £400 for alleged unskilful and negligent treatment by the defendant, Richard Vallack, in respect of an operation performed by the defendant on the plaintiff for an injured rib. The action was heard in the Metropolitan District Court before His Honour Judge Edwards and a jury of four on February 10 and 11, 1931.

Mr. Clive Evatt (instructed by Mr. Abram Landa) appeared for the plaintiff.

Mr. J. W. Shand (instructed by Messrs. McNamara and Smith) appeared for the defendant.

JOHN TINTER, sworn, examined, deposed:

To Mr. Evatt: I am an iron worker employed by Dorman, Long and Company at the bridge works shop. On the thirteenth of May, 1929, I met with an accident. I was carrying a bag of bolts along a girder and slipped on to my left side. I fractured certain of my ribs on the left side and injured my left elbow. I went to the Mater Hospital. I was able to walk there. I saw Dr. Vallack about tea time. He examined me and bandaged my ribs and bandaged my elbow, too. He said to me: "Who is your private doctor?" I replied: "I have none." After further discussion I agreed to call at his surgery in Miller Street, North Sydney. In the same conversation he told me my ribs were fractured. I called at his surgery next morning and he gave me a certificate which I took to the Government Insurance Office, who are the insurers for Dorman, Long and Company. I went to Dr. Vallack regularly for about seven weeks. I was not X rayed. I was placed on compensation by the Government Insurance Office. I attended the Government Insurance Office on more than one occasion and I there saw Dr. Gibbes. Dr. Gibbes asked whether I had been X rayed. I told him I had not been X rayed and he sent me to Dr. Edwards to be X rayed. I went to Dr. Vallack and told him that I had been X rayed. A day or two later, I obtained a certificate from Dr. Vallack which I took to the Industrial Office of Dorman, Long and Company. I commenced work and was put on light work.

I noticed there was still some pain in my left side and so on the sixth of October I went to Dr. Vallack again. I saw him at his surgery and told him that I was still having pains in my left side where the ribs had been fractured. He examined me and said: "You had better go at once to Dr. Vickery and have an X ray." I went to Dr. Vickery the following day. I returned to Dr. Vallack and again saw him at his surgery. He said to me: "I have seen the plates and they show that your ninth rib is decayed. I will have to operate on it straight away." He then gave me a certificate which I took to the Commission. This certificate was to the effect that an immediate operation was necessary. They told me at the

Commission that they would have to hold a medical board. I went back to Dr. Vallack and he ordered me into hospital next morning. I was operated on by Dr. Vallack; Dr. Stayner gave the anæsthetic. I saw Dr. Vallack next morning after the operation. I remained in hospital seven weeks and three days from the eleventh of October till the seventh of December. He came and told me to go and be an out-patient to his surgery. About a week after the operation I had an accident to my left foot caused through a steel block falling on it. I was away on compensation for two and a half to three weeks. I went to Dr. Vallack for this and he treated me. I resumed light work, but the pains in my side got worse again.

DR. JOHN G. EDWARDS gave evidence that in the X rays taken by him on the eighth June, 1929, he could not see a second fracture of the ninth rib. (Dr. Vallack had stated before the Workers' Compensation Commission, where the matter had come up previously, that these X rays showed two fractures of the ninth rib.) What Dr. Vallack had pointed out (at the Commission) as a fracture was where the cartilage came on to the rib; it was always an uneven joint. There was a sinus to the tenth rib in witness's X rays of fifth December, 1929. The anterior portion of the tip of that rib had been taken off. There was no indication of any operation to the ninth rib.

DR. LENNOX GRAHAM TEECE stated that he had not examined the plaintiff, but had heard the evidence and seen the X rays. If a nerve were involved in the healing tissue he would not expect painful symptoms. The intercostal nerves run in a groove in the rib and it is accordingly impossible to fracture a rib completely without damaging a nerve and when that rib unites in every case the intercostal nerve must get involved in the healing tissue. One does not get pain for weeks after a rib is broken even after union has taken place. If there is any pleurisy one may get pains lasting a long time, but one will not get pain from involvement of nerve because every man with a fractured rib must get his intercostal nerve involved. He would not think that a man who had practically no pain when given his clearance, would have pain from the nerve or ribs three months later. If the site of the fracture were tender, one would expect the pain to get steadily less. Prior to this case he had not heard of such an operation as that performed by the defendant. He would not advise such an operation. He had never read any authorities that suggest such an operation. His reading on orthopædic surgery was fairly wide. There was none of the ninth rib missing. A portion of the tenth was missing.

DR. VIVIAN BENJAFIELD deposed that he had not seen or read of an operation such as that performed by Dr. Vallack on the rib. He would neither perform nor advise such an operation himself.

RICHARD VALLACK, sworn, examined, deposed:

To Mr. Shand: I am a legally qualified medical practitioner, practising my profession at Miller Street, North Sydney. I examined Tinter on the day of the accident, thirteenth May, 1929. I discovered a fracture of the ninth and tenth ribs. The fractures were close to the junction. If you discover the break, it is not usual to have an X ray. I strapped him up. On the twenty-fourth June, 1929, he returned to work. On October the sixth he complained a little bit of pain. It was getting worse gradually. He said it was a stabbing pain and that it got worse when he lifted anything. I examined him. It would be unusual for it to be getting worse progressively. I pressed him, got him to twist. I gave him the note for the X ray on the sixth October. Dr. Vickery reported: "Old fractures of the seventh and eighth, recent fracture of the ninth which was incompletely united." The X ray would not show cartilage fracture. I again examined Tinter. I advised an operation. I was not concerned to know whether it was the tenth or the ninth. I found a tender spot. Before operation I again examined him and made a mark with a needle. Dr. Stayner was present at operation. I made incision where I had marked it. I found a hard mass of healing tissue not quite settled down to normal. I decided to take it out and lifted it up. I cut the bone at the junction of the cartilage and bone. I found the nerve was involved and that confirmed my original diagnosis. The blood vessels had not healed. It was a dull red. That was a sure sign that there had been injury. I had never heard of a similar case. It is usual with fractures in other parts of the body. It was unusual to find such a thing. About seven-eighths of an inch altogether of cartilage and bone was removed. I showed that to Dr. Stayner. The rib as at present causes no harm to a man. There was an injury to his elbow, too, a bruised tissue with no break in the section. He developed acute gout. The wound broke down. I was not surprised at it happening to him. If it was not for the sinus he would have gone back to work straight away. He said on one occasion: "I have been able to go to work." It has not worried him. I operated where the pain was. I never said that I was willing to forfeit all expenses. Tinter said to me: "What are you going to do about it." I said: "I do not know, I have cured your trouble." I sent him one account after that. My wife posts my accounts. I have no copies of the accounts.

DR. ARCHIE ASPINALL deposed that he had neither performed nor heard of such an operation to the rib as that performed by the defendant, yet it was a frequent thing for a nerve to get involved in other parts of the body and he could see no reason why one should not get involved in this case. In view of the plaintiff's symptoms he considered that an operation was advisable, and the correct method was to localize the pain and operate over it. Skiagrams are often misleading and in many cases it is not safe to operate on the evidence of a skiagram alone.

DR. D. J. GLISSAN gave evidence similar to that of Dr. Aspinall.

DR. H. R. SEAR identified skiagrams taken by him on the eighth of November, 1930.

DR. F. E. STAYNER gave evidence that he had given the anæsthetic when the defendant operated on the plaintiff. He saw the nerve involved in the healing tissue. He remembered it distinctly, as it had interested him at the time as a curiosity.

The jury brought in a verdict for the defendant.

Correspondence.

POLICE OFFENCES AMENDMENT (DRUGS) ACT, 1927 (NEW SOUTH WALES).

SIR: Medical practitioners in New South Wales should note that Part VI of the *Police Offences Amendment (Drugs) Act*, 1927 (commonly referred to as the "Dangerous Drugs Act") now applies to:

(1) Barbituric acid and all substances or preparations obtained directly or indirectly from or combined with barbituric acid, whether described as "Veronal," "Medinal," "Dial," "Luminal," "Sodium Luminal," or by any other trade name, mark or designation;

(2) Indian hemp (*Cannabis indica*), including the resins obtained from Indian hemp, and any preparation, extract or tincture of Indian hemp;

(3) Paraldehyde or its preparations,

in the same manner as it applies to the drugs (morphine, cocaine, ecgonine, diamorphine *et cetera*) mentioned in paragraph (*a*) of Subsection (2) of Section 18 of the said Act:

(2) (*a*) The drugs to which this part of this Act applies are morphine, cocaine, ecgonine, and diamorphine (commonly known as heroin) and their respective salts, and opium, and any preparation, admixture, extract, or other substance containing not less than one-fifth *per centum* of morphine or one-tenth *per centum* of ecgonine, cocaine, or diamorphine.

For the purpose of the foregoing provision the percentage in the case of morphine shall be calculated as in respect of anhydrous morphine.

Yours, etc.,

J. G. HUNTER,
Medical Secretary, New South Wales Branch of the British Medical Association.

British Medical Association House,
135, Macquarie Street, Sydney.
March 5, 1931.

TRICHOMONA VAGINALIS.

SIR: With reference to Dr. Lethbridge's letter on *Trichomona vaginalis*, I have a history to relate.

Some months ago a clean looking girl of nineteen consulted me about an intensely irritating eruption over the *labia majora* and inner aspect of the thighs. She denied the possibility of venereal infection for many months, although she admitted she had been guilty in the past. She was not the sort of person who would fail to notice such an abnormality. She worked and used the lavatory in a public place. There was no urethritis or vaginitis. I painted the affected area thoroughly and frequently with a 2% solution of mercurochrome. The external condition began to improve at once, but she developed a vulvitis and vaginitis within a week, with red, hot, swollen mucous membrane and a profuse creamy discharge. I examined smears, half expecting to find some known or unknown fungus, but found nothing diagnostic. I then sent a smear fixed by heat to a pathologist. who reported pus cells and numerous organisms, but nothing resembling gonococci. I was confirmed in my belief that the disease was not gonorrhœa, and told her so.

About two months later, after constant and assiduous treatment, all external signs had disappeared. There was constantly present creamy pus in the vaginal vault, the cervix discharged a little clear mucus, there were numerous shallow ulcers, like those of aphthous stomatitis, that came and went rapidly, on the cervix; the urethra and Bartholinian glands were normal.

The girl then burnt her foot and was away for three weeks.

A young man then came to see me with what was clinically an acute attack of gonorrhœa. He had cohabited with this girl, and this girl only, about ten days before. He had succeeded only after great persistence—which fits in with the girl's previous account of herself, or may have been due to doubt on her part of the consequences. I think, now, the former.

The pathologist reported on a dried smear, pus cells and organisms morphologically resembling gonococci.

The examination of this unusual type of laboratory animal altered my preconceived ideas and gave me to ponder greatly on the selective affinity of certain tissues for specific organisms.

Rightly or wrongly, I no longer use local treatment in the acute stage of gonorrhœa in the male, for fear, partly, of such complications as epididymitis, which this man, of course, contracted. It was a very mild attack, and on its subsidence all his symptoms disappeared in the most remarkable way on simple general treatment.

By this time the girl was back again, in exactly the same condition, and greatly chastened when I told her of my discovery.

Nothing now remains of this pathological comedy of errors, except a little creamy pus in an otherwise healthy vagina, but it will not go away. Then I read Dr. Lethbridge's letter, and this morning, with a glass rod, a slide and a little warm saline, I found dozens of his "little rats nibbling at bits of cheese." Having watched the progress of the two cases so carefully and being so impressed with the activity on the slide, I am certain, with him, that the trichomonads are not merely incidental. I do not wish to waste your space with an academic discussion on their exact immunological relationship, but will Dr. Lethbridge, to whom many thanks already are due, or some one else, provide an appropriate treatment, either through your columns, for general interest, or preferably, in the first place, direct to me.

The matter is urgent. The young man told his friends, who do not deal in trichomonads, the restaurant keeper paid off the girl after long and faithful service. She wishes to make a fresh start in another town in a few weeks, while the opportunity offers to do so quietly, and I do not want to let her go until she is quite well.

The only reference I can find is in a book that gives an excellent brief account of trichomonads and says that *Trichomona vaginalis* will not live in an alkaline medium. It further states that *Trichomona vaginalis* has on rare occasions been the cause of urethritis in the male. ("Clinical Diagnosis by Laboratory Methods," Todd, 1924.)

Yours, etc.,

E. A. WOODWARD.

Grafton
New South Wales,
February 26, 1931.

TONSILLECTOMY.

SIR: You have said that correspondence in the pages of our journal is of value if the subject is approached with the genuine desire to reveal the truth. This is as it can only be, and therefore I may be pardoned for entering into the discussion on the question of "Tonsillectomy." When I read your leading article on this question in the February 7 issue of the journal I was pleased, in the first place, because, although the subject had many times before been brought up, you still considered it worthy of further discussion, and secondly, because it contained such definite expressions of opinion that correspondence would most assuredly eventuate. I consider the relative merits of the various popular forms of treatment of tonsillar disease should be still further ventilated and each assigned, if possible, to its proper place. The main objects, I assume, of your leader were to direct your readers, who in the main are general practitioners, and who, not being experts in all or maybe even in one of the methods, look to you for guidance to a reasonable outlook on the question, and also to emphasize that an incomplete removal of tonsil tissue may render the patient no better off than he was before having subjected himself to operation. Also I assume it was your aim to point out that the more expert an individual is in a particular method, the more the chance of his producing the maximum good result and, *vice versa*, the more unversed the practitioner is in the method, the less likely he is to perform his work competently. These matters I think you have estimated in a just manner. At the first reading I, with some others like Dr. Bryan Foster and Dr. F. W. Fay, did not like your dogmatizing in such a bold manner, but when I considered the facts left unsaid in your leader, I must confess that your article appeared to me very fair.

The reverse guillotine method of enucleating tonsils, which has held considerable sway for a long time, has been connected with the name of Sluder. This is more or less a universal use by throat surgeons in the English speaking countries, although we Britishers know it was practised and described by Englishmen before the advent of Sluder's own description. In your criticism on Fowler's "Tonsil Surgery" in the July, 1930, issue of *The Journal of the College of Surgeons of Australasia*, you mentioned this fact, showing thereby that you were aware of it. I do not think, therefore, that any severe criticism can be levelled against your leader on this score. For some years now throat surgeons have been endeavouring to teach the profession in general that if the "tonsil" is to be operated upon at all it must be thoroughly removed. The "Sluder" method was an advance on the old "Mackenzie" method and I maintain that, speaking generally, the method by dissection is a still further advance on the "Sluder" method. With the more complete removal of diseased tonsil tissue it became evident that the benefits to the patient increased; for it must be remembered that the very cases which present "focal sepsis" manifestations, are the very ones which require the most thorough removal of diseased lymphoid tissue about the pharynx.

We do not now consider that the tonsil is a separate organ, but rather a portion of the mass of adenoid tissue about the pharynx, which portion has acquired a so-called capsule in its upper two-thirds or so and which branches off down the lateral wall of the pharynx and on to the base of the tongue, the pharyngeal and lingual branches or the infratonsillar nodes as called by some. There are some experts who maintain that they can successfully remove these latter two portions of the tonsil tissue with the guillotine, but it requires methods of force, such as special block moulds forced into the outer side of the neck and at least two, but generally more than two, applications

of the guillotine. Personally, whenever I find force is needed to dislocate the "tonsil" into the ring of the guillotine, I discard the instrument and resort to the dissection method. Such force, I maintain, results in much bruising of the fauces with subsequent scar formation and tightening of the palate—a far more frequent sequela than is generally appreciated. In addition the method is far from precise, for not infrequently, even by the leading advocates of the "Sluder" method, much of the faucial mucous membrane and even muscle is removed. Personally, I used the reverse guillotine method for removing "tonsils" in children, but with this addition, that I now always look for and remove, when present, enlarged pharyngeal and lingual prolongations by a process of "plucking" with a Luc's forceps. I consider that all other types can be more thoroughly dealt with by the operation of expanded tonsillectomy by dissection.

The question naturally arises: "Is it necessary to deal with these tonsillar prolongations in all cases," and one must answer that "it is not always necessary, especially in children." It can be said that for the average case in a child the reverse guillotine method meets with the requirements, but there is a percentage which requires further attention and we realize how great the number may be only after we have spent a few years in private practice and after we have then had these patients brought back to us, or worse, when they have been taken elsewhere and it has been said how badly our work had been done. I think one can safely say that no throat surgeon of some years' standing has escaped this experience, which shows how we have fallen short of our aims. This fact alone should be sufficient to satisfy even the enthusiast for the "Sluder" method that his claims are not all he thinks them. Assuming that the guillotine operation has been performed "properly," what is the reason for the recurrence sometimes, even to the extent of a mass resembling a normal tonsil in position and size, and even to possessing a "capsule" in its upper part? The answer is "incomplete removal." To go into the relative merits of "enucleation" by the guillotine and by dissection would be out of place in this letter. I would emphasize, however, that the tonsil surgeon's slogan of "the tonsil, the whole tonsil, and nothing but the tonsil" cannot logically be realized by any method other than by performing the operation of expanded tonsillectomy, which is what one does in the best methods of removal by dissection.

At a later date it may be convenient to again enter the lists, but for the present I congratulate you upon your bold statements, which to some may contain some rather hard knocks to take, but most throat surgeons who have thought a good deal upon the question, cannot but agree with your expressions. I think that all who practise surgery of the tonsils should at least peruse Fowler's most readable and superbly illustrated book on "Tonsil Surgery" and the address delivered before the Section of Laryngology of the Royal Society of Medicine, "Gradual Diathermy Destruction of the Faucial Tonsils," by Dan McKenzie, which appeared in the proceedings of the Society on June 20, 1930, and in the *Journal of Otology and Laryngology*, October, 1930. Dan McKenzie, than whom there is no more ardent supporter of the diathermy method, makes the following remarks: "as in the ordinary operation, the lower 'pole' of the tonsil near the tongue is apt to be overlooked—I have noticed that caseous *débris* formation goes on until the last remains have vanished." He says that the great drawback was its tediousness; it might have to be carried out every week or fortnight for three, four or more months and that it required considerable expertness to successfully perform it.

In view of Dr. Bryan Foster's letter I might be permitted to sum up by saying:

1. That your leading article in question may be "extraordinary," but I do not think it can be "harmful" or damaging.

2. That "Sluder's" operation (as is ordinarily performed) always results in incomplete removal of tonsil tissue.

3. That by your criticism you have shown that you are acquainted with the "latest" on the question and that you have been fair in allotting to experts of each method a measure of praise for their competence in their particular routine procedure.

4. That really I think Dr. Bryan Foster is incorrect in stating that the collection of lymphoid tissue below the tonsil is disconnected with the "tonsil." Developmentally and in its adult state it is very much connected, as it is part and parcel of the same mass; and again he is incorrect when he says that the lingual and pharyngeal tonsillar branches do not contain crypts and that there is no infection to be found in these positions.

5. That the "Sluder's operation" is a term now universally used.

6. That I agree with Dr. Foster when he says that the "Sluder" operation is easy only after one has learnt the knack, but I consider that this requires but little practice to the individual with the mechanical sense.

7. That the expert with the tonsillotome can remove what is assumed to be the whole tonsil, but that it is a very difficult and perhaps questionable method to follow in removing the lower portions of this structure.

8. That the difficulty or otherwise of enucleating a "tonsil" by the guillotine is determined by the degree of fibrous adhesions between the tonsil and its bed and so in children it is comparatively an easy operation. Interpreted, this means that the less the amount of past tonsillar inflammation, the easier the enucleation will be, for inflammation ends most often in the formation of fibrous tissue, both within and without the tonsil, and subsequently in a tethering down of the tonsil in its bed.

9. That from the above it does not mean that the tonsillectomy operation by the guillotine should be "absolutely and utterly condemned." Rather it has its sphere of usefulness, like all other methods, even that "cure for all ills"—diathermy.

10. That I agree with Dr. Foster in that the results of a properly performed operation are really and equally good, no matter whether the tonsillotome or dissecting method is employed, but I use his reservation that "by properly performed I mean one that will never have to be repeated because the whole of the infected tonsil has been removed."

11. That the surgeon, if he be not expert with the requisite method, should hand the patient over to someone who is, for the patient must here, as always, be the first consideration.

Yours, etc.,

R. GRAHAM BROWN.

Preston House,
Brisbane,
March 6, 1931.

Medical Prizes.

THE GARTON PRIZE AND MEDAL.

THE British Empire Cancer Campaign announces that the Grand Council has determined that the second Garton Prize and Medal will be awarded for the essay embodying results of original investigations, which in the opinion of judges appointed by the Grand Council of the British Empire Cancer Campaign is the best contribution towards the biological effects and mode of action of radiations upon malignant and other cells.

Candidates, who may be of either sex, must be British subjects, domiciled in the British Empire, and not at the time members of the Grand Council of the British Empire Cancer Campaign. An honorarium of £500 may be awarded either to an individual or to a group of persons who jointly submit the dissertation. The dissertation must be delivered to the Honorary Secretary to the British Empire Cancer Campaign before December 31, 1933.

THE KATHERINE BISHOP HARMAN PRIZE.

THE Council of the British Medical Association is prepared to consider an award of the Katherine Bishop Harman Prize in the year 1932. The value of the prize is £80.

The purpose of the prize, founded in 1926, is the encouragement of study and research directed to the diminution and avoidance of the risks to health and life that are apt to arise in pregnancy and child-bearing. Competitors are left free to select the work they wish to present, provided the work falls within the scope of the prize. Any medical practitioner registered in the British Empire is eligible to compete for the prize.

Should the Council of the Association decide that no essay submitted is of sufficient merit, the prize will not be awarded in 1932, but will be offered again in the year next following this decision, and in this event the money value of the prize on the occasion in question shall be such proportion of the accumulated income as the Council shall determine. The decision of the Council will be final.

Each essay must be typewritten or printed in the English language, must be distinguished by a motto, and must be accompanied by a sealed envelope marked with the same motto and enclosing the candidate's name and address. Essays must be forwarded so as to reach the Medical Secretary, British Medical Association House, Tavistock Square, London, W.C.1, not later than December 31, 1931. Inquiries relative to the prize should be addressed to the Medical Secretary, as above.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

AT a recent meeting of the Senate of the University of Sydney the following appointments were made:

Dr. Raymond Firth as Acting Professor of Anthropology from May 16 to December 31, 1931.

Mr. H. I. Hogbin, M.A. (Research Fellow at the London School of Economics), as Temporary Lecturer in Anthropology from June 1 to December 31, 1931.

At Sydney Hospital: Dr. H. J. Ritchie and Dr. A. W. Holmes à Court as Lecturers in Clinical Medicine.

Dr. H. Skipton Stacy and Dr. Archie Aspinall as Lecturers in Clinical Surgery.

Dr. G. C. Willcocks, Dr. W. Evans and Dr. E. H. Stokes as Tutors in Medicine.

Dr. W. A. Ramsay Sharp, Dr. A. M. McIntosh and Dr. W. Kay as Tutors in Surgery.

Mr. K. B. Noad as Student Demonstrator.

Dr. R. J. Millard as Clinical Lecturer in Infectious Diseases at the Coast Hospital.

The following dates were selected for University ceremonies: Matriculation ceremony, Friday, April 10; conferring of degrees, Saturday, May 2.

The Senate has decided to confer the *ad eundem* degree of Doctor of Laws (LL.D.) upon Lord Robert Baden-Powell on the occasion of his visit to Sydney.

Obituary.

JOSEPH ESPIE DODS.

THE news of the death of the late Dr. Joseph Espie Dods, which occurred at Brisbane on December 6, 1930, came as a great shock to his many friends throughout the Commonwealth. He was a man of sterling worth, beloved by many and respected by all with whom he had dealings.

Joseph Espie Dods was born in London on June 29, 1874. He came to Brisbane with his mother in 1877. He was sent to school at Brisbane Grammar School and subsequently spent six months at a school at Morat, in Switzerland. He studied medicine at the University of Edinburgh and obtained the degrees of Bachelor of Medicine and Bachelor of Surgery in 1897. In 1898 he went to Ireland to qualify for the Diploma in Public Health. In the following year he returned to Brisbane and took up practice. In 1902 he was appointed Government Medical Officer and he held this position until his death.

Dods was one who always felt and took his share of responsibility. In both the South African War and the Great War he took an active part. He served in the former as captain with the first contingent of the Queensland Mounted Infantry. When war broke out in 1914 he was one of the first to volunteer and went away in 1914 as medical officer to the Fifth Light Horse. In 1916 he was Deputy Assistant Director of Medical Services of the First Division. He was decorated with the Military Cross and the Distinguished Service Order and was twice mentioned in dispatches. He returned to Brisbane in 1917. He was appointed Commonwealth Medical Officer in 1919 and held this office with distinction until 1930. He was medical officer to the Australian Mutual Provident Society from 1924 to 1930. As Dr. W. N. Robertson has stated in his appreciation, Dods took an active part in the affairs of the Queensland Branch of the British Medical Association. His judgement was sound and his advice on ethical matters was generally accepted. Those who were privileged to be received in his home, knew him as a genial host and saw in him a devoted husband. He will be sorely missed.

Dr. W. N. Robertson writes:

The sudden death of Dr. J. Espie Dods on Saturday, December 6, at his residence, Wickham Terrace, Brisbane, removed an outstanding figure in the ranks of the profession in Brisbane. He had served his King and country in two wars. During the South African War he went through the campaign as medical officer with the First Queensland Contingent. There he established a lifelong friendship with such distinguished soldiers as Sir T. W. Glasgow, Sir Harry Chauvel and Colonel Cameron. In the Great War he immediately volunteered and went overseas with the Light Horse as medical officer. He was wounded badly on Gallipoli as a result of exposure to heavy fire succouring the wounded.

In France he carried efficiently his heavy responsibilities as Deputy Assistant Director of Medical Services with the First Division. In recognition of his services he received a D.S.O. and M.C.

I have been repeatedly told by members of the South African Expeditionary Force that no one was more deserving of a Victoria Cross than he.

Coming nearer home, he was President of the Queensland Branch of the British Medical Association, for many years on the Council, and also represented the Branch on the Federal Committee in 1925. He was President of the Medical Defence Society for some years. He was an invaluable member of any committee. His keen, incisive mind promptly sifted the grain from the chaff, and his knowledge of what was right in almost any difficulty was quite uncanny.

Showing the esteem in which he was held by men of his class, he was elected President of the Queensland Club four years in succession, an honour never previously held by any member.

He never took up ordinary medical practice seriously, but acted as Chief Government Medical Officer for Queensland, Chief Medical Officer for the Commonwealth in Queensland, until that position was abolished, and Chief Medical Officer for the Australian Mutual Provident Society. His sterling honesty and unflinching courage, together with his keen mentality, rendered his services in these positions absolutely invaluable. I have often wondered where his unusual ability would have led him had he devoted himself more directly to the conventional aspects of medicine or surgery.

Espie Dods was quixotically generous. He strove to do good by stealth and it was by accident only that one became aware of his benefactions. Few members of our profession inspired deeper affection from his fellows. Personally, I was proud to call him friend. He leaves a wife and four children, whom he adored and who worshipped him, to mourn the passing of a great figure in our profession and our city.

Books Received.

ULTRA-VIOLET RADIOTHERAPY, by W. Kerr Russell, M.D., B.S.; 1930. London: Jonathan Cape Limited. Crown 8vo., pp. 130. Price: 5s. net.

A MANUAL OF SURGERY FOR STUDENTS AND GRADUATES, by F. T. Stewart, M.D., and W. E. Lee, M.D.; Sixth Edition; 1931. Philadelphia: P. Blakiston's Son and Company. Royal 8vo., pp. 1320, with 787 illustrations. Price: $10.00.

CLIMATE AND ACCLIMATIZATION, SOME NOTES AND OBSERVATIONS, by A. Castellani, K.C.M.G., D.S.C., M.D., F.R.C.P.; 1931. London: John Bale, Sons and Danielsson. Crown 8vo., pp. 159, with charts. Price: 7s. 6d. net.

Diary for the Month.

MAR. 24.—New South Wales Branch, B.M.A.: Council.
MAR. 25.—Victorian Branch, B.M.A.: Council.
MAR. 26.—South Australian Branch, B.M.A.: Branch.
MAR. 27.—Meeting of the Federal Committee of the B.M.A. (Melbourne).
MAR. 27.—Queensland Branch, B.M.A.: Council.
APR. 1.—Victorian Branch, B.M.A.: Branch.
APR. 2.—South Australian Branch, B.M.A.: Council.
APR. 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.
APR. 9.—Victorian Branch, B.M.A.: Council.
APR. 9.—New South Wales Branch, B.M.A.: Clinical Meeting.
APR. 10.—Queensland Branch, B.M.A.: Branch.
APR. 14.—New South Wales Branch, B.M.A.: Ethics Committee.
APR. 21.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
APR. 22.—Victorian Branch, B.M.A.: Council.
APR. 24.—Queensland Branch, B.M.A.: Council.
APR. 28.—New South Wales Branch, B.M.A.: Medical Politics Committee.
APR. 30.—South Australian Branch, B.M.A.: Branch.
APR. 30.—New South Wales Branch, B.M.A.: Branch.

Medical Appointments.

Dr. A. R. Southwood (B.M.A.) has been appointed Honorary Physician at the Adelaide Hospital, South Australia.

* * *

Dr. F. S. Hone (B.M.A.) has been appointed Honorary Consulting Physician at the Adelaide Hospital, South Australia.

* * *

Dr. A. D. Byrne (B.M.A.) has been appointed Junior Resident Medical Officer, Parkside Mental Hospital, South Australia.

* * *

Dr. V. P. Johnson (B.M.A.) has been appointed Acting Medical Superintendent of the Hospital for the Insane and Receiving House, Ballarat, Victoria, pursuant to the provisions of the *Lunacy Act*, 1928.

* * *

The undermentioned have been appointed Members of the Advisory Committee in connexion with Medical and Dental Inspection in State Schools, Victoria, from January 1, 1931, to December 31, 1931: Sir J. W. Barrett (B.M.A.), Dr. B. T. Zwar (B.M.A.), Dr. E. H. Barrett (B.M.A.), Dr. E. Robertson (B.M.A.), Dr. W. S. Wilkinson (B.M.A.), Dr. C. G. Godfrey (B.M.A.), Dr. J. Dale (B.M.A.) and Dr. R. J. B. Yule.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi.

PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.

SAINT GEORGE DISTRICT HOSPITAL, KOGARAH, NEW SOUTH WALES: Honorary Assistant Obstetrician.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members desiring to accept appointment in ANY COUNTRY HOSPITAL, are advised to submit a copy of their agreement to the Council before signing, in their own interests. Brisbane Associated Friendly Societies' Medical Institute. Mount Isa Hospital. Mount Isa Mines.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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